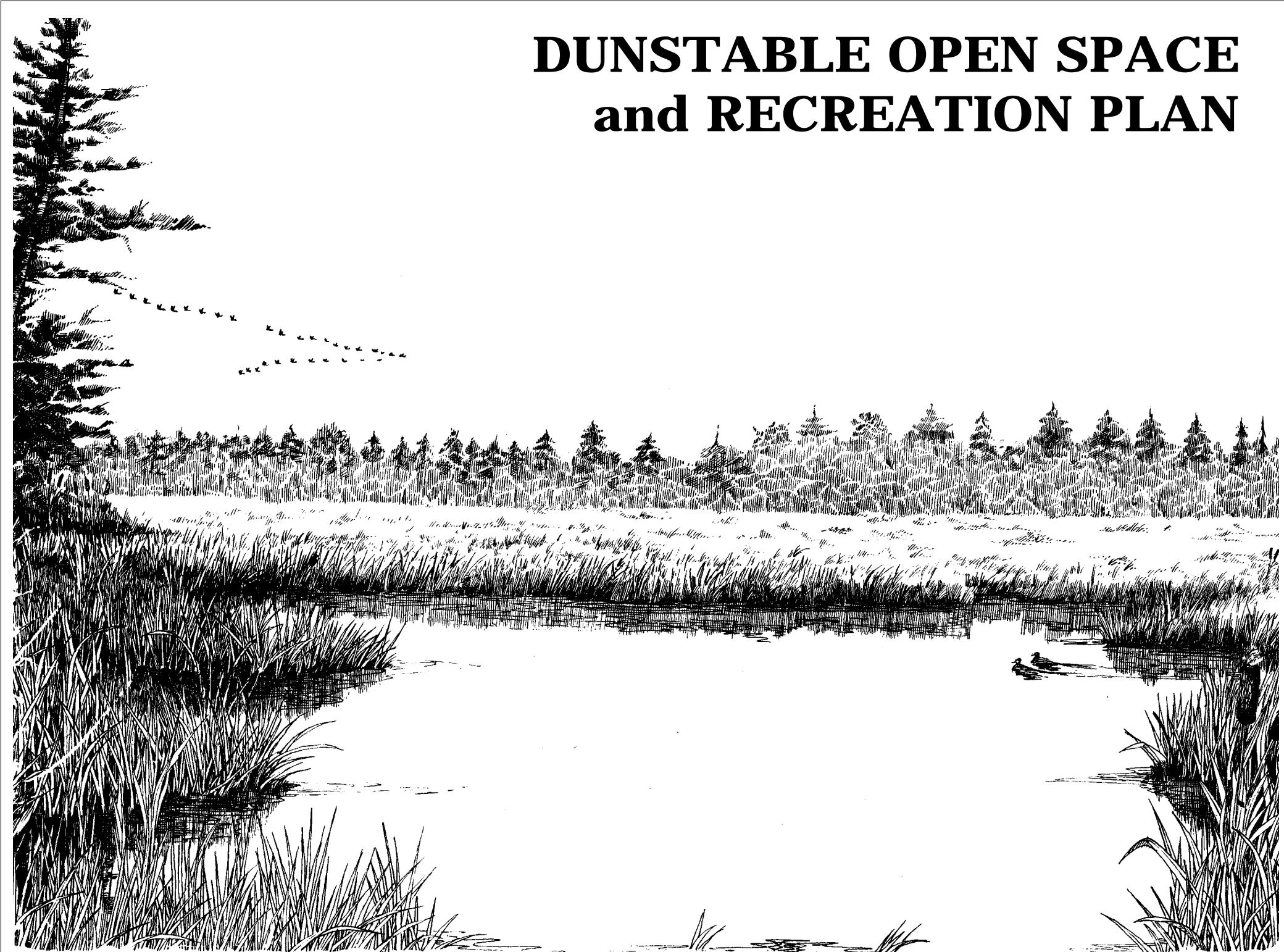


DUNSTABLE OPEN SPACE and RECREATION PLAN



OPEN SPACE and RECREATION PLAN DUNSTABLE, MASSACHUSETTS

January, 1998

Update of the 1976 Dunstable Open Space and Recreation Master Plan

Prepared by Liz Fletcher, Planner

For the Dunstable Conservation Commission

Acknowledgement

This plan is based on the good work of Alfred Lima of the Environmental Collaborative, who prepared Dunstable's original Open Space and Recreation Plan. The illustrations are the work of Kevin E. Wilson, done for the original Plan. Permission to use their work in this updated document has been graciously given. The Town of Dunstable has benefitted from the steadfast service of some dedicated people, who were active in town government at the time of the 1976 Plan and who continue to serve the town today. Among them are Alan Chaney and William Moeller of the Conservation Commission, and Robert Kennedy, who was Selectman in 1976, and today is a member of the Board of Assessors. The assistance of Conservation Commission members and other Dunstable citizens on this Plan Update is gratefully acknowledged.

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TABLE OF CONTENTS

Section 1 - Plan Summary	4	Section 6 - Community Goals	79
Section 2 - Introduction	5	Description of Process	80
Statement of Purpose	5	Statement of Open Space and Recreation Goals	80
Planning Process and Public Participation	5	Section 7 - Analysis of Needs	81
Section 3 - Community Setting	7	Summary of Resource Protection Needs	85
Regional Context	8	Summary of Community's Needs	86
History of the Community	9	Management Needs, Potential Change of Use..	90
Population Characteristics	12	Section 8 - Goals and Objectives	93
Growth and Development Patterns	15	Conservation Goals and Objectives	94
Section 4 - Environmental Inventory and Analysis ..	23	Recreation Goals and Objectives	101
Importance of Environmental Resource Analysis	25	Section 9 - Five Year Action Plan	103
Geology, Soils, and Topography	26	Section 10 - Public Comment	
Landscape Character	37	Section 11 - References and Appendices	
Water Resources	40	Appendix A: Americans with Disabilities Act/ Section 504 Self-Evaluation	
Vegetation	55	Appendix B: Minutes of Planning Meetings	
Fisheries and Wildlife	60	Appendix C: Record of Accomplishments, Analysis of Surveys, Conservation Matrix	
Scenic Resources and Unique Environments	63	Appendix D: Other Documentation	
Potential Environmental Problems	65		
Section 5 - Inventory of Lands of Conservation and			
Recreation Interest	67		
Public and Nonprofit Lands	70		
Private Lands	76		

List of Maps

Historic Sites.....	page 10
Zoning.....	page 19
Surficial Geology.....	page 29
Soils.....	page 31
Slopes.....	page 34
Topography.....	page 35
Watersheds.....	page 41
Flood Prone Areas.....	page 46
Wetlands.....	page 47
Aquifers.....	page 52
Conservation Lands.....	page 69
Five Year Action Plan.....	page 110

List of Tables

Population	12
Age Distribution.....	12
Income Distribution.....	13
Regional Housing, Value, Income, and Taxes.....	13
Employment of Dunstable Residents.....	14
Commuting to Work from Dunstable.....	14
Dunstable's Land Uses.....	16
Zoning.....	18
Estimate of Dunstable's Potential Build-out.....	20
Open Space Pays.....	82
Greenway, Estimated Acres, Estimated Cost.....	84
Five Year Action Plan Timeline.....	111

A Note about the Cover and Section Dividers:

The pen and ink drawings were done for the original 1976 Plan by Kevin E. Wilson, based on Dunstable scenes he sketched at that time. Twenty years later, most of these local scenes can still be found.

The Cover: Lower Massapoag Pond
Section 3: The Larter residence on Main Street
Section 4: A wood duck nesting box on Salmon Brook
Section 5: Shaw's Pond from Pond Street
Section 6: Structures on Pleasant Street, looking from Main Street
Section 8: Salmon Brook marsh
Section 9: A barn somewhere in Dunstable
Section 10: The Tully farm



SECTION 1 - PLAN SUMMARY

The Town of Dunstable seeks to preserve its rural character, to bring forth into the future as much as possible of its New England agrarian landscape. Dunstable's timeless tapestry of farm fields, forested hills, ponds, streams, and wild wetlands, fine old houses and barns, and winding stone-walled tree-lined roads forms the very fabric of the town's nature. The vision of this 1998 Open Space and Recreation Plan update is that Dunstable can grow within this tapestry, saving its essential elements while accommodating well-planned development that respects the town's natural and historical environment. To accomplish this delicate balance, open space conservation must be a high priority as growth proceeds. Dunstable's quality of life depends on it.

The primary conservation goals of this plan are to protect the town's water resources, to complete Greenways along Dunstable's major streams, to enlarge existing conservation lands and link them into a comprehensive open space network,

and to protect Dunstable's outstanding scenic places.

The primary recreation goals of this plan are to provide adequate fields for athletic and other outdoor recreational uses, to protect and improve the town's system of trails for foot travel, bicyclers, and horseback riders, and to assure access to the town's water bodies for swimming, fishing, and boating.

This plan sets forth the objectives to accomplish these goals. It includes an analysis of Dunstable's community setting and community needs, as well as an environmental analysis of the town's many natural resources, and an inventory of lands of conservation and recreation interest. A five-year action plan sets forth steps toward fulfilling these goals.

SECTION 2 - INTRODUCTION

Statement of Purpose

This plan is the first update of Dunstable's original Open Space and Recreation Master Plan completed in February 1976 by the Environmental Collaborative of Cambridge, Mass. For two decades that plan served the town well as a guide to the protection of Dunstable's natural resources, and many of its recommendations have been accomplished, as shown in the Appendix Record of Accomplishments.

The 1976 Plan has lasting quality. Some sections have been incorporated into this plan update. Its original goals are still worth striving for, and they are included here. Its environmental analysis has been included with few modifications, because its documentation of Dunstable's natural resources still holds true. Most of the original maps are relevant today. The 1976 Plan's illustrations show many local scenes that still exist, and they are included in this update to illustrate Dunstable's timeless beauty. Many of the plan's original objectives have been modified to reflect present concerns, and new recommendations are made based on today's community needs.

This is a good time to renew Dunstable's open space and recreation planning efforts, because the town is now undertaking a comprehensive Master Planning process. Some of the data gathered for the Master Plan have been useful for this plan. In turn, this Open Space and Recreation Plan can be a part of the Master Plan, providing guidance on resource protection, conservation, and recreation needs.

Dunstable citizens have long shared a concern about the vulnerability of the town's rural character to poorly designed land development. The 1976 Plan addressed this concern. In 1990, the town formed a Rural Design Study Committee with representatives from the Selectmen, Historical Commission, Conservation Commission, and Planning Board. They com-

missioned the planning firm IEP to do a Rural Landscape and Design Study and make recommendations for revisions to town regulations. The 1990 Rural Land Preservation Survey conducted as part of this study highlighted the strong desire of Dunstable's citizens to protect the rural character. 79% of the respondents expressed willingness to invest tax dollars to protect the town's natural, scenic, and historic resources.

This plan is intended as a guide to help Dunstable's people work together to protect the natural resources and cherished open spaces of their town, and to enable these places to be enjoyed by future generations. In the words of planner Alfred Lima, in his dedication to the original 1976 Plan — "Few towns are more worthy of protection."

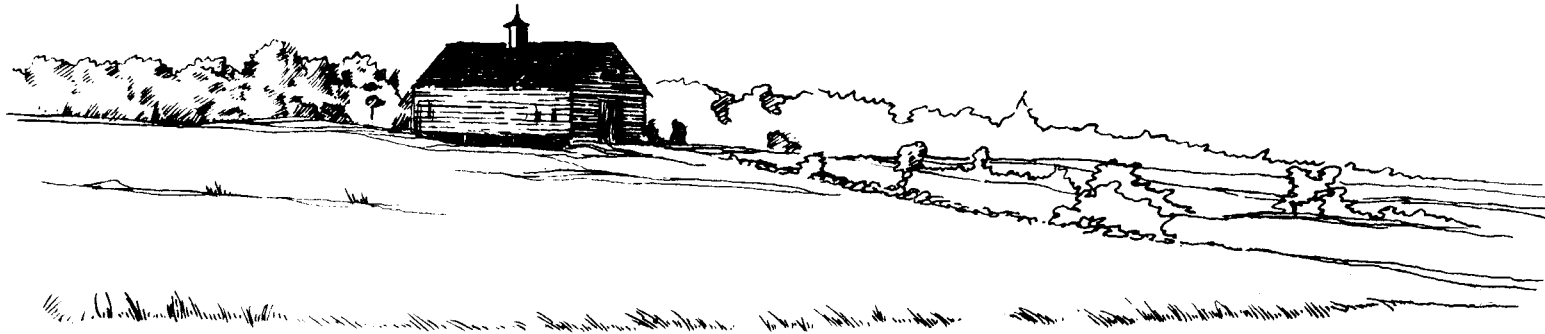
Planning Process and Public Participation

The Dunstable Conservation Commission engaged Liz Fletcher, planner of the recent 1995 to 2020 Vision for the Nashua River Watershed, to update the 1976 Plan. The Commission as a whole worked as the Open Space Planning Committee, with members providing assistance and information. The North Middlesex Council of Governments supplied demographic data. Data on development was provided by the Planning Board and Board of Assessors Master Plan Study. Elaine Basbanes of the Dunstable Rural Land Trust and Ruth Rogers, Secretary to the Commission and the Board of Assessors, researched land ownership for the Inventory to update the town's GIS Open Space Map. Carolyn Wurm of the Recreation Commission gathered input from this Commission. The Conservation Commission and the planner met 6 times in 1996 and 1997 to discuss the plan. The Commission also hosted two public planning meetings during 1996, first to receive input on Community Needs, and then to discuss the Goals and Objectives and Five-Year Action Plan. A variety of concerns and many good ideas for action were brought forth at these meetings.

Section 3

Community Setting





Regional Context

Dunstable lies at the eastern edge of the central New England upland. In common with the surrounding regional landscape, the town shows a characteristic combination of hilly and poorly drained glaciated terrain, with drumlins, outwash deposits, streams, and ponds that are the remnants of the glacial meltwaters. It shares water resources with surrounding towns, most notably Massapoag Pond with Groton and Tyngsborough. Its aquifers are shared with its neighbors, such as the Salmon Brook aquifer with Groton, Tyngsborough, and Nashua, and the Unkety Brook aquifer with Pepperell. As an upland town, much of Dunstable is a source of water to its neighbors: Salmon Brook, Dunstable's central waterway, drains into Nashua, NH, and the eastern quarter of the town drains into Locust and Flint Ponds in Tyngsborough. Yet Dunstable's three major streams — Salmon and Unkety Brooks, and the Nashua River — all receive drainage from outside the town, and land development in these watersheds could influence the town's water quality. On Dunstable's western border, the Nashua River drains nearly 500 square miles. Dunstable contributes to the Nashua River as well through Unkety Brook, whose watershed includes the western quarter of the town.

As one of the 31 towns of the Nashua River watershed,

Dunstable is a key cornerstone of this watershed's open space wedge. The Nashua River watershed is still a largely rural landscape lying between the metropolitan areas of Nashua on the north, Worcester on the south, and Fitchburg-Gardner-Leominster on the west. As a town whose character remains rural, Dunstable forms the northeast corner of the Nashua Valley's open space network. Lying between the urban centers of Nashua, NH, and Lowell, Dunstable remains a rural oasis thanks to the many active farms and managed forests in the community, and to the continuing efforts of the town's Conservation Commission and conservation land trust, the Dunstable Rural Land Trust.

However, Dunstable has not escaped impacts from urbanization in its neighbors. Most obvious is the development of south Nashua as a regional commercial center, with its Pheasant Lane Mall. Traffic on Dunstable's Main Street has increased very noticeably since the Mall opened. Residential development in Dunstable is likely fueled by job opportunities in surrounding metropolitan areas. With very few jobs in the town, the average employed Dunstable resident commutes to a job nearly half an hour's drive away.



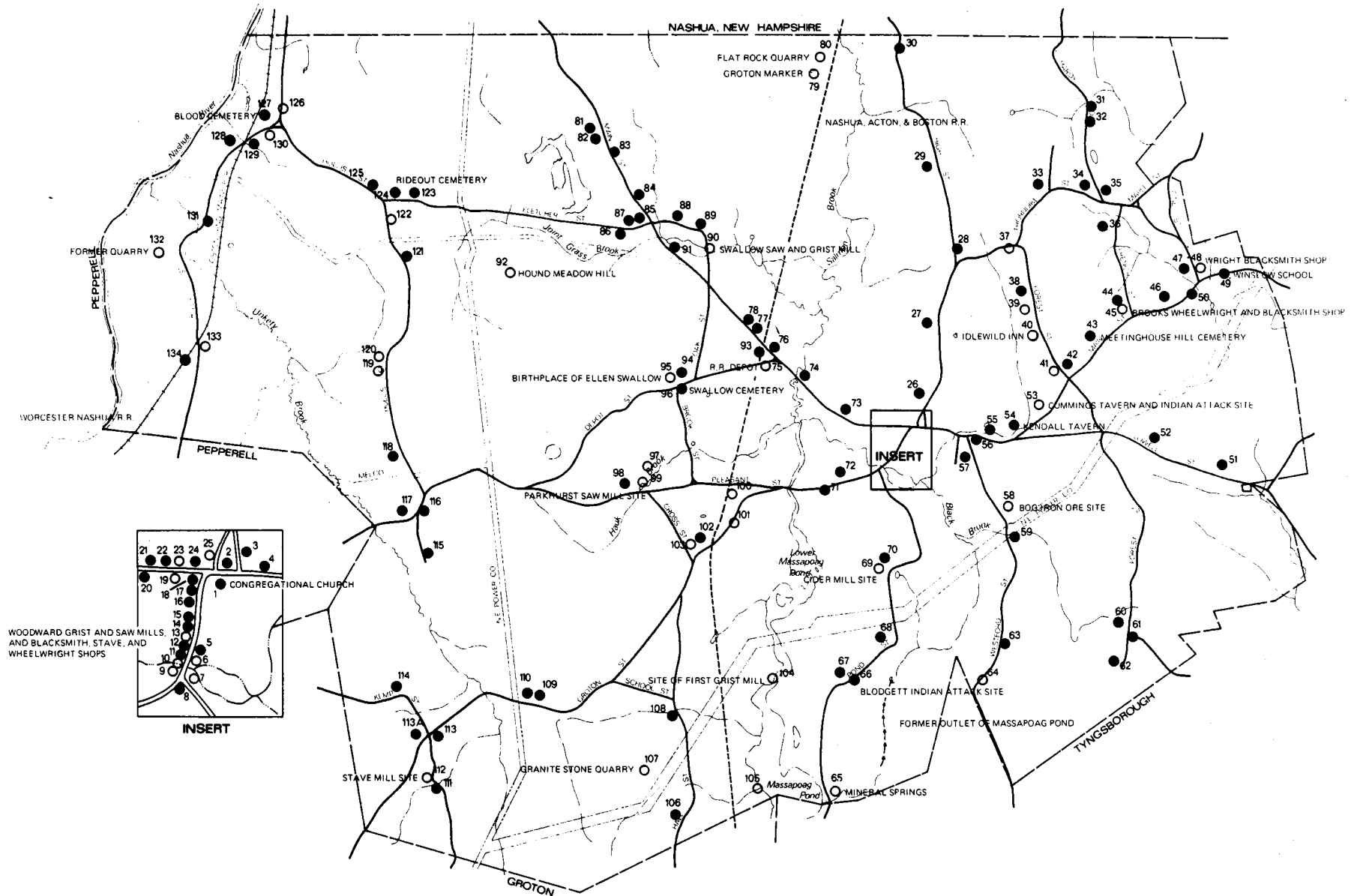
History of the Community

Dunstable's history is that of the classical transition from a self-sufficient farming community to its present metropolitan economic inter-dependence. The historic economic base of Dunstable has been farming, with related activities such as timbering and wood milling. In the past five decades, with the general decline of farming activity, the town has become more closely tied to the economies of the nearby urban areas of Nashua and Lowell. Much of its residential growth during this time has likely occurred as a result of regional job growth.

The first human inhabitants of the area — the native Americans — lived almost exclusively off the land through hunting, fishing, gathering wild fruits, and cultivating corn, beans, and squash. The first European settlers brought with them technologies which enabled them to use the land and its resources more intensively than the native Americans. One of Dunstable's early economic activities was the bleeding of pine trees for pitch and turpentine, which was one of the town's

first exports and source of revenue. Bog iron ore was also extracted from the town's swamps and sent to Chelmsford for processing. Peat and clay for bricks were also early extracted natural resources.

For the most part, however, the town was a nearly self-sufficient economic entity, with agriculture as its economic base and principal export product. Elias Nason's history of Dunstable lists the primary agricultural products in 1873 as hay, corn, oats, rye, barley, potatoes, vegetables, fruit, and harvesting of forest products. Hay and grain were food sources for the dairy farms, other grains were processed into flour in the town's grist mills; vegetables were used for domestic production and also exported, as were fruit from the town's orchards. The town's sawmills processed local logs, stave mills manufactured barrels for agricultural products and by-products, and its blacksmith and wheelwright shops assured that there was necessary transportation to bring the



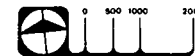
LEGEND

- SITE LOCATIONS ONLY
- SITES WITH BUILDINGS STILL EXISTING OR CEMETERIES STILL EXTANT
- 59 REFERENCE NUMBERS FOR STRUCTURES EXISTING BEFORE 1875

SOURCE: HISTORIES OF DUNSTABLE AND MRS. FLORENCE HAMPTON.

HISTORIC SITES

Prepared for the Dunstable Conservation Commission
Dunstable, Massachusetts



environmental
collaborative
ENVIRONMENTAL PLANNING
LANDSCAPE ARCHITECTURE
COMMUNITY PLANNING
SOCIAL RESEARCH

produce to market. To use modern economic jargon, the agricultural economy of Dunstable was fully “integrated.”

In 1873 there were 90 farms in Dunstable. The map of historic sites shows the structures existing at that time and other significant landmarks. A full list of structures is given in the Appendix. One of these landmarks is the birthplace of Ellen Swallow, one of America’s first environmental activists. Her scientific efforts led to the development of the three main environmental sciences: ecology, limnology, and euthenics. She opened the world’s first Sanitary Science Laboratory of its kind at M.I.T. in 1884, was that university’s first woman faculty member, and was the founder of the American Economics Association and the American Association of University Women. She is often referred to as “America’s First Lady of Science.”

Dunstable’s 1976 Open Space and Recreation Master Plan found that the town’s historical era of being an agricultural economy was giving way to physical integration into the Lowell/ Nashua metropolitan land use pattern. The 1976 Plan stated that the town had three alternatives before it: it could become totally suburbanized in single-family residences; it could purchase land and preserve it as public open space and resource conservation; or it could encourage and help preserve economic uses which keep the land in private ownership yet open (primarily in agricultural and forestry uses). The 1976 Plan predicted that the degree to which Dunstable became as heavily suburbanized as neighboring towns would depend to a great extent on encouraging local economic uses of land which would lessen the pressures on private land owners to sell.

The 20 years of history that have passed since then have shown that the people of Dunstable, by pursuing the two alternatives of open space conservation and economic uses of private open lands, have experienced a relatively gradual pace of suburbanization that has allowed the town’s rural character to remain essentially viable.

Even now near the end of the twentieth century, Dunstable has nearly 30 farms with more than 1,700 acres classified under Chapter 61A. Although not all these acres are actively farmed, this classification means that the land must provide a yearly minimum economic return from agriculture. Another nearly 1,000 acres are classified as managed forest under Chapter 61. Although these special property tax classifications do not serve as permanent open space conservation measures, their prevalence indicates that many Dunstable landowners have intentions of carrying on farming and forestry for the long term.

Over the past two decades, Dunstable’s conservationists have been active as well. At the time of the 1976 Plan, the town had only 341 acres of conservation and town forest land. At the time of this plan, Dunstable has 1,595.6 acres of public and private land permanently protected for conservation, recreation, and agriculture -- more than quadruple the amount conserved two decades ago! Many unconserved gaps remain in the network of resources that need protection, but great progress has been made through continued efforts of Dunstable’s Conservation Commission, Planning Board, and the Dunstable Rural Lands Trust, the community’s private citizen conservation group.

Population Characteristics

Population Growth and Density: Although Dunstable's population growth rate dropped markedly in the 1970's from its all-time high rates of the 50's and 60's, in the 1980's population growth accelerated again. In the 1990's the rate of growth appears to be slackening, but the increase in population numbers is similar to the 1980's. Dealing with the needs of a continually growing population must be an ongoing concern of the town.

Year	Population	Increase in Number	Rate of Increase during Decade
1950	522		
1960	824	302	57.8% 1950 - 60
1970	1,292	468	56.8% 1960 - 70
1980	1,671	379	29.3% 1970 - 80
1990	2,236	565	33.8% 1980 - 90
1995	2,518	282	22.4% if continues during 5 years over decade

Dunstable's population density 1995: 150.4 people per square mile

State population density 1990: 728.6 people per square mile

As a rural town, Dunstable's population density is significantly lower than that of the state as a whole. The town center is an area of somewhat denser population, yet its character is still that of a rural village. Most of Dunstable's population is dispersed throughout the town's area; the eastern portion of the town is more sparsely settled than the center and southwest.

Age and Income Distribution: Dunstable's population is comparatively young, with a higher proportion of children and a lower proportion of senior citizens than the state average. In keeping with these figures, Dunstable's larger household size than the state average would indicate that the town has a sizable proportion of families with children. Such a population would tend to have needs for more active recreation facilities such as tot lots and ball fields. 65% of Dunstable's children live in households where both parents work (57%) or the single parent works (8%). The state level is similar (63%). These demographics would indicate a need for after-school programs and supervised recreational activities for the town's children.

Age Distribution (1990 Census)

	Number of persons	%	State average
Under 5	182	8.1	6.8
5 - 17	433	19.4	15.6
18 - 44	1,010	45.2	45.3
45 - 64	480	21.5	18.6
65 and over	131	5.9	13.6

Dunstable average persons per household 1990: 3.2

State average persons per household 1990: 2.7

Dunstable enjoys a much lower poverty level and significantly higher household incomes than the state average. Among its seven neighboring towns, Dunstable ranks highest in median family income and house value according to a recent analysis done by the Board of Assessors for the town's Master Planning study.

Income Distribution (1990 Census)

	Households	%	State average
Less than \$5,000	12	1.7	4.1
\$5,000- 9,999	8	1.2	9.3
\$10,000 - 24,999	55	7.9	19.9
\$25,000 - 34,999	62	9.0	13.8
\$35,000 - 49,999	108	15.6	18.6
\$50,000 - 74,999	190	27.5	19.7
\$75,000 - 99,999	161	23.3	8.0
Over \$100,000	96	13.9	6.6
Dunstable median household income	\$62,515		
State median household income	\$36,952		
Dunstable poverty level	1.5%		
State poverty level	8.9%		

Regional Housing Value, Income, and Taxes

<u>Town</u>	<u>1995 Median House Value</u>	<u>1990 Median Family Income</u>	<u>1995 Tax Rate</u>	<u>Median Tax Bill</u>
Dunstable	\$220,800	\$65,720	\$14.16	\$3,126.52
Westford	\$211,500	\$63,047	\$15.38	\$3,252.87
Groton	\$203,900	\$60,000	\$17.69	\$3,606.97
Chelmsford	\$177,000	\$59,368	\$19.04	\$3,370.08
Tyngsborough	\$169,700	\$52,358	\$20.06	\$3,404.18
Pepperell	\$166,700	\$49,259	\$14.13	\$2,355.47
Townsend	\$147,500	\$50,629	\$17.74	\$2,616.65

Dunstable's median tax bill ranks 5th lowest, less than all but Townsend and Pepperell, and its tax rate is lower than all but Pepperell. This could allow an opportunity for some community investment to preserve Dunstable's rural character.

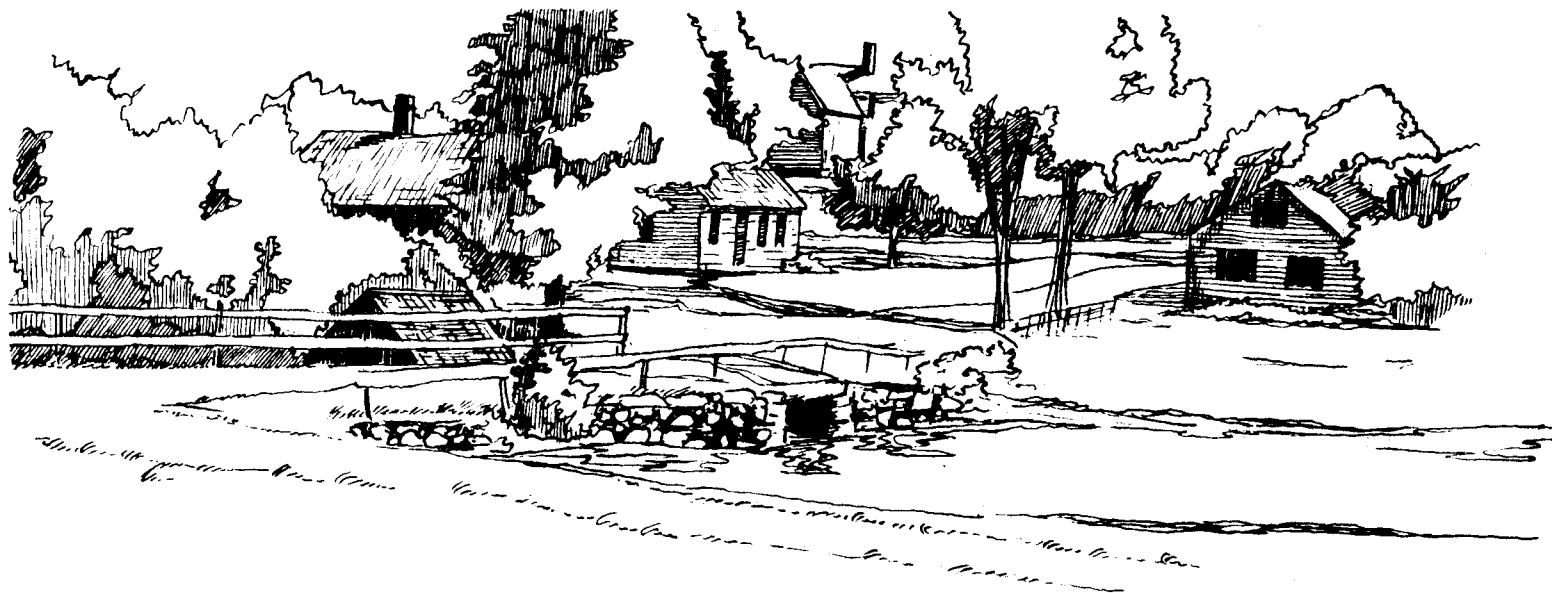
Economy: A high proportion of Dunstable people are workers. With 692 households and 1,212 people employed, this means on average there were 1.75 people employed per household in 1990. The state average was 1.35 people employed per household. Most of these workers are employed outside the town. North Middlesex Regional Council of Governments (NMCOG) figures for 1990 show only 164 people employed within the town. Many of these local workers find jobs in the agricultural and public sectors (local government and school district) as well as being self-employed. NMCOG data indicate that 141 Dunstable households, 20% of the town's total, earn some income from nonfarm self-employment. With an average income of \$21,556, some of the local nonfarm self-employment would be part-time. With an average commute of nearly half an hour, most employed Dunstable residents work in various regional employment centers: Nashua, NH, the Lowell area, and other parts of the Route 495 region. In keeping with the relative vigor of the region's economy, Dunstable's unemployment rate is lower than the state level. To provide for some business growth in the town, Dunstable has established an Expanded Commercial Zone on its eastern boundary, abutting a similar zone in Tyngsborough near the Route 3 and Route 113 intersection in that town. This zone comprises 140 acres, which could potentially be developed into numerous enterprises (light manufacturing, offices, research labs) on 100,000 square foot lots (2.3 acres). However, nearly one-quarter of this zone may be wetlands, and its soils are generally hardpan types, limiting the land's ability to absorb large quantities of wastewater. When developing this zone, great caution will be required to prevent water pollution. Most of this zone's land is now classified under Chapter 61 and 61A, forest management and agriculture.

Employment of Dunstable Residents (1990 Census)

Type of Employment	Number of residents
Services	405
Manufacturing	314
Wholesale & Retail Trade	217
Construction	85
Transportation & Communication	73
Finance, Insurance, Real Estate	46
Government	41
Agriculture	29
Mining	2
Dunstable labor force employed	1,212
“ “ “ “ unemployed	80
Dunstable unemployment rate	6.2%
State unemployment rate	6.7%

Commuting to Work from Dunstable

Drove alone	86.8%
Carpools	6.8%
Walked or worked at home	5.6%
Public transportation	0.8%
Average travel time to work: 28.8 minutes	
Mean number of vehicles available per household:	
-- in Dunstable: 2.4	-- in the state: 1.5



Growth and Development Patterns

Patterns and Trends

Although its agricultural roots are still thriving, Dunstable is facing suburbanization as residential growth continues to increase. Other than very limited areas that have been zoned for multi-family or commercial uses, the vast majority of the town is zoned single family residential with 2-acre lots. This is the form of development that will have the greatest influence on Dunstable's future.

As a look at the typical suburban town shows, the conventional legal tools used to control the quality and density of development have not prevented this development from transforming many handsome New England towns into monotonous enclaves without any distinguishing character. Large lot zoning or any of the other traditional land use controls will not necessarily save Dunstable from this fate.

The rate of housing development in Dunstable is increasing faster than overall population growth. In the 1980's the growth in the number of households outstripped the rate of population growth, increasing by 44% (from 480 to 692), while population grew by 33.8%. Dunstable shared the national trend of decreasing household size, going from an average of 3.5 persons per household in 1980 to 3.2 in 1990. With a pattern of preponderantly single-family housing (95% of Dunstable's 1990 housing stock is single-family), this causes population growth to have a relatively greater impact on the landscape.

As the town enters the second half of the 1990's, building activity appears to continue at a high rate: five plans with a potential for 53 more lots are now before the Planning Board. The following table shows Dunstable's residential building trends over the past 25 years.

Decade	Increase in Houses	Average per Year	Subdivision Lots	ANR Lots
1970's	153	15	23	130
1980's	220	22	74	146
1990-95	151 (5 years)	30	5	146

Sources: Planning Board data and a recent analysis done by the Board of Assessors for Dunstable's Master Planning study.

Residential use is the fastest growing land use. About 467 acres of residential use were added from 1971 through 1995.* Although forest is by far the largest land use in Dunstable, it is decreasing as residential acreage grows. Agriculture is the second largest land use, and most of this land is enrolled in Chapter 61A. It is heartening to note that conservation and recreation form Dunstable's third largest land use with nearly 10% of the town's area. Yet this is small compared to other towns in the region such as Townsend, which has nearly one-third of its area in conservation, or Andover, which has 20%. Many critical natural areas remain unconserved.

Dunstable's Largest Land Uses

<u>Type of Land Use</u>	<u>Acreage</u>	<u>% of Town Area</u>
Forest (1985) 973 acres in Chapter 61	7,460	69.7%
Agriculture (1985) 1,715 acres in Chapter 61A, 213 acres APR	1,931	18.0%
Conservation/Recreation (1995)	1,032	9.6%
Residential (1985)	628	5.9%
Residential (1995) *	877	8.2%

Dunstable's Land Uses

Total area of Dunstable: 16.74 square miles or 10,704 acres

<u>Land Use Category</u>	<u>1971 Acres</u>	<u>1985 Acres</u>	<u>Change</u>	<u>% Change</u>
Forest	7,855	7,460	-395	- 5.0%
Agricultural / Open Cropland	1,951	1,931	-20	-1.0%
Pasture	693	716	+23	+3.3%
Open	709	700	-9	-1.3%
Orchard/Nursery	464	440	-24	-5.2%
Residential	85	75	-10	-11.8%
Wetlands	410	628	+218	+53.2%
Water	356	354	-2	-0.6%
Urban Open Land	91	131	+40	+44%
Recreational	13	90	+77	+592%
Mining	33	78	+45	+136%
Commercial / Industrial	26	62	+36	+138%
	3	3	0	0

Largest increase in acreage 1971-85: Residential +218 acres

Largest decrease in acreage 1971-85: Forest -395 acres

Source: "Land Use Update for Massachusetts with Area Statistics for 1971 and 1985" by MacConnell, Goodwin, and Jones, Mass. Agricultural Experiment Station, October 1991. The state is analyzing more recent data from 1991 aerial photography, but this is not available. Wetland acreage is low because forested wetlands are counted under forest.

* 1995 residential acreage is based on 151 houses built in 1990's (Assessors Master Plan study) plus 98 houses built from 1986-89 (Annual building permit graph). McConnell et al. estimate 1 acre of land used per house (there were 627 houses in 1985).

Infrastructure

Information sources: North Middlesex Council of Governments, Dunstable Water Department, and Board of Health

Public Water System: Approximately 5% of the town's population are served. 91 meters are installed that serve the school, church, fire station, town hall, 2 farms, 3 businesses, and 82 residences around the town's center. The source is a well in the Salmon Brook aquifer north of Main Street. 25,000 gallons per day are pumped, an average of 275 gallons a day per meter served. The Board of Health judges that the aquifer is of adequate capacity for any foreseeable need, but the well itself is adequate only for the limited number of customers on the lines. Storage is minimal, and the system is inadequate to serve as a firefighting supply except to take water from the hydrants up to the limit of the well pump, about 250 gallons per minute. 1996 Town Meeting voted to spend \$180,000 to develop a back-up well near the existing well, which will double capacity to 500 gallons per minute.

Piping extends through the town center along Main Street from Salmon Brook to Lowell Street and along Pleasant Street from Salmon Brook to town center. Hillcrest and Highland Streets are also served. There are plans to upgrade existing smaller pipes to 12 inch pipe. The Water Department is promoting expansion of its services through Planning Board subdivision approvals, but no planning studies have been done regarding upgrading of the system, the costs of developing the existing well and providing adequate storage. The Board of Health is concerned that subdivision builders may sometimes put in mains that are too large, which could lead to water quality problems when long lines are used by only a few homes.

The majority of Dunstable's homes and businesses depend on their own wells.

Wastewater Treatment: There is no public sewer system in Dunstable. All wastewater treatment is done through onsite septic systems. Most 2-acre lots must provide their own water source and their own wastewater treatment onsite. Careful siting, installation, and maintenance of septic systems is essential to protect water quality. There is no other treatment option readily available.

Solid Waste Disposal: Dunstable has a trash transfer station and recycling drop off facility. This operation is located at the now-closed landfill site.

Transportation: Dunstable is entirely dependent on its road network and private cars. The relatively high number of cars per household (2.4) testifies to this dependence. This car-dependent system of transportation leads to a dispersed pattern of development. No bus service is available in the town. Commuter rail service to Boston is available in Lowell, with 700 MBTA parking spaces. Route 113 (Pleasant and Main Street) is Dunstable's major artery, extending across the town from west to east. It connects in neighboring Tyngsborough with Route 3, the heavily traveled north-south highway.

Traffic on Route 113 has increased very noticeably since the Pheasant Lane Mall opened in south Nashua, NH, just off Route 3. Traffic counts done in 1991 and 1994 show a 70% increase on Main Street at the Tyngsborough line, and a 48% increase on Pleasant Street near the town center.

The narrow, winding nature of Dunstable's roads is an integral part of the town's rural character. This has been recognized through the town's designation of all its roads (except Route

113, a state highway) as Scenic Roads. Route 113 from the town center to the Tyngsborough line is also a very scenic road, with its stone walls, large shade trees, and vistas of fields, farms, and woods. There is strong concern among townspeople about protecting this rural landscape along Route 113, the “Gateway to Dunstable”.

Other Infrastructure

A form of infrastructure that has relevance for conservation in the Information Age is the library. At the Community Needs public meeting, the need for more information about existing conservation lands, trails, and other town resources was emphasized. People need to know more about their community resources and the local library would be an appropriate clearinghouse for videos, maps, and guides. The library is now planning to expand at a site bordered by Black Brook near the town center. It is hoped that the new library can integrate the conservation aspects of this site into its plans.

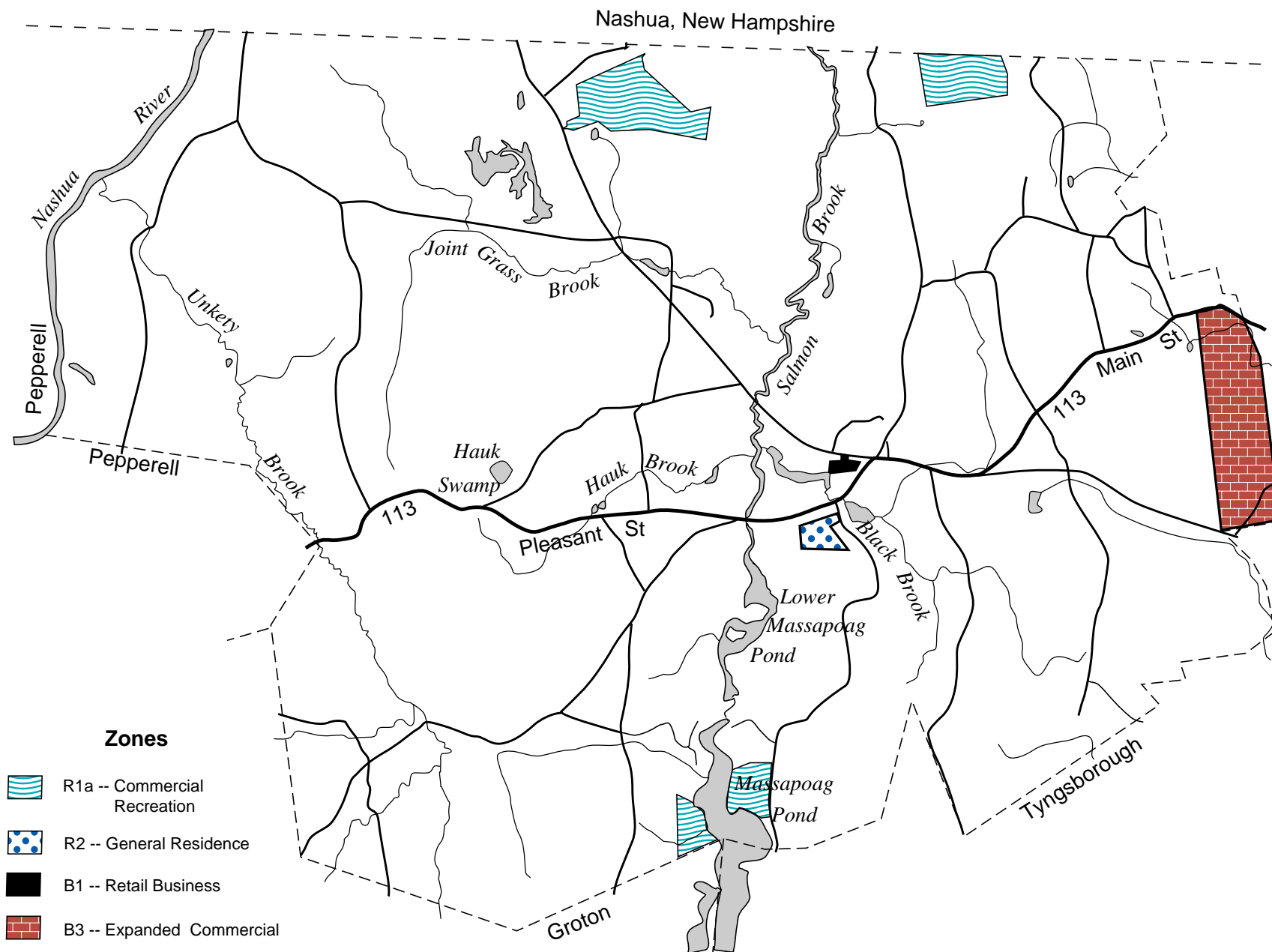
Long-term Development Patterns

In 1976, the Open Space and Recreation Plan noted that suburbanization had only just begun. Twenty years later, with over 425 more houses, Dunstable still retains much of its rural character due to a combination of several factors. Most owners of large land-holdings continue to retain their land in open space uses, assisted in part by reduced property taxes under the Chapter 61 programs; 2-acre zoning may have slowed the pace of development; and clustering is an option frequently used by developers in Dunstable, which results in 35% of a project's land being kept in open space.

With 2-acre single-family zoning covering most of the town, Dunstable is programmed to become a suburban bedroom community. Without continuing efforts to increase Dunstable’s protected open spaces, the town’s rural character will gradually be lost, and the costs to serve a population without a commercial tax base would create a heavy burden of taxes. Although this process will likely take many decades (North Middlesex Council of Governments estimates that Dunstable’s population will only be 3,600 in 2025), development of some highly visible rural landscapes such as those along Route 113, can cause the perceived loss of Dunstable’s rural character to accelerate.

If fully built out as zoned, Dunstable would be almost five times more densely populated than it is today, with a density close to the state’s present population density.

Zoning	Approximate Acreage	Location
R1 -- Single family	10,410	All over town
R1a -- Commercial Recreation	130	Massapoag Pond and Sky Meadow Golf Course
R2 -- General Residence (multi-family)	16	corner of Pond and Pleasant Streets
B1 -- Retail Business	8	corner of Main and Pleasant Streets
B3 -- Expanded Commercial	140	Main Street to Blodgett Street on the Tyngsborough line



0 1/2 1 mile

Note: This map is for planning and educational purposes. Due to its small size, it cannot be used to precisely locate areas on the ground.

ZONING

DUNSTABLE, Massachusetts

Open Space and Recreation Plan 1998

Prepared for the Conservation Commission

Estimate of Dunstable's Potential Build-Out

10,704 acres Dunstable's total area (16.74 square miles)
- 1,070 acres Wetlands & water estimated at 10% of total area
- 1,595.6 acres Permanently protected land as of January 1998
- 535 acres Roads estimated at 5% of total area
7,503 acres built & possible buildable land = 3,752 2-acre lots

Estimated Population at build-out: nearly 11,300 people or 675 people per square mile, if each lot had an average-sized 3 person single-family household.

The 1976 Open Space and Recreation Plan did a build-out scenario projecting that 4,012 more lots would be created under 2-acre zoning, after subtracting out the developed and public lands that existed at the time. Because 1,254 acres have been conserved since 1976, 627 potential lots have been eliminated. This would account for the higher 1976 build-out figure, which gave Dunstable an ultimate total of about 4,462 lots when the 450 households that existed in 1976 are included.

On the whole, the two build-out scenarios are within a reasonable range of each other. They are presented to illustrate the ultimate outcome of 2-acre zoning if no further conservation of land occurs. Land conservation, along with well-designed development controls, is a crucial tool for shaping the town's ultimate livability. Long before Dunstable reaches its build-out level, the costs of servicing the needs of a nearly entirely residential town would become quite burdensome.

Conservation of significant natural and recreational lands would be a wise investment in the town's long-term well-being in many ways.

A sizable majority of townspeople are willing to make this

investment, as shown by the 79% affirmative response to the 1990 survey's question on spending tax dollars to protect open space resources. With so many resources worthy of protection, that have benefits to the region beyond Dunstable's borders, this is a significant project deserving of support on a state-wide level.

The extensive network of wetlands throughout the town indicates that much acreage would be rendered unbuildable by wetlands. However, wetlands can be included within buildable lots. As suburbanization continues and increasingly marginal land is subdivided, more building lots would be likely to include wetlands and their buffers. This situation creates difficulties both for the wetlands and the homeowners. Actively used yards abutting wetlands would tend to increase the levels of nutrients reaching the wetlands and decrease the natural vegetation of the buffer area as fertilized lawns tend to extend to the edge of the wetland. And when wetlands do their natural function of water storage in spring runoff and floods, homeowners may be distressed as their yards become reclaimed by the wetlands. It would be best for all concerned to respect wetlands and their buffers by requiring sufficient upland in each lot for a home, a septic system, and a yard, while restricting structures from wetland buffers.

A significant amount of potential building remains in the pipeline. The plans approved since 1974 include a total of 207 approved lots, of which 102 remain unbuilt. With these lots and those more recently approved by the Planning Board, a greater number of subdivision lots is in the pipeline than the total lots that were built in the first half of the 1990s. But these subdivision lots represent only a small part of the overall residential building picture in Dunstable.

Approval Not Required (ANR) lots account for about three-quarters of the home-building. ANR lots must be automatically approved by the Planning Board when they have the required 2 acres and 200 feet of frontage on an existing road. This gives planners little control over many development-related impacts.

Dunstable's development patterns during the past two decades have been quite dispersed. Five of the 9 sizable subdivisions (10 or more lots) have taken place in the southern half of the town, but three subdivisions with a total of 56 lots are near the northern border, one with 57 lots is on the western border. The report done by the Board of Assessors for Dunstable's Master Plan shows that the northeast quadrant of the town has historically experienced the least building, while the central and southwest sections have had the most building. But given Dunstable's accessibility to nearby regional employment centers (Nashua, Lowell, and Route 495), all parts of town can be considered vulnerable to development pressure.

Much building will continue to occur under ANR, beyond the scope of planners. The high proportion of ANR building is likely to decrease over time as buildable road frontage diminishes, but this unplanned form of growth will continue to be a fragmenting force upon Dunstable's landscape for some time to come. The rural character of Dunstable's scenic roads is very vulnerable to suburbanizing pressure from ANR subdivisions. Given traditional influences upon the state legislature, it is unlikely that state law mandating ANR will be changed to allow municipalities to guide all of their future growth.

Cluster: The town can exert some guidance over development patterns through its cluster development bylaw (Open Space

Development Regulation). Of the 9 sizable subdivisions approved since 1974, 7 have been cluster. It would appear that developers find Dunstable's bylaw a reasonable way to proceed, with its requirement for 35% of the tract area to be kept as permanent open space and its allowance for reduced lot sizes and frontages, with the total number of lots to be no more than could otherwise be developed considering the limitations of the land. The full effect of the Open Space Development Regulation remains to be seen, because only one cluster development has been fully built out (Parkhurst Street). Of the 126 cluster lots that have been approved, 99 remain unbuilt as of the end of 1995.

What do these trends mean for Dunstable's remaining open spaces? As it is now, cluster development cannot bring about a coherent assemblage of open spaces. Cluster is a good means to guide residential growth patterns to include some permanent open spaces. But much wildlife habitat, and some economic and recreational land uses need large contiguous blocks of open land. Cluster development alone cannot be counted on to provide sufficient open space for the town's future needs.

One way to improve cluster's potential to protect significant open spaces would be to allow up to half of a cluster's open space land requirement to be fulfilled through the conservation of valuable off-site parcels. Cluster developers could buy conservation restrictions or agricultural preservation restrictions from willing owners of significant open space parcels. This method was suggested by IEP, Inc. in its 1990 Rural Landscape and Design Study for the town. The nearby town of Hudson, NH has a similar provision in its cluster development bylaw.

Two commitments are required if Dunstable is to retain its rural character into the next century. Put forth in Dunstable's 1976 Open Space and Recreation Master Plan, and carried on well by townspeople over the past two decades, these are well worth affirming as continuing goals --

- * a public and private commitment to conserve land as permanent open space, either through purchase or donations of land or conservation easements;
- * and a community commitment to encourage local economic uses of existing open spaces through activities such as farming, forestry, and open space recreation.

It is one of the primary objectives of this plan to provide the analysis and recommend approaches to preserving the rural integrity of Dunstable while absorbing the inevitable growth. However, this plan is only part of the work that needs to be done. It is a part of a larger comprehensive planning process now ongoing to determine how Dunstable can grow in desired development patterns. This process would analyze all of the demographic and economic forces at work within the region, supplemented with basic environmental information (wetlands, bedrock, water table, soils) to allow a definitive delineation of what areas are suitable or not suitable for residential development .

From this the Town can then construct a growth and development policy which has a sound rational economic and ecological basis, and which will be capable of withstanding court challenge of those zoning and subdivision regulations which are to implement that policy. This Open Space and Recreation Plan will be a substantial part of that comprehensive planning process.

Section 4 Environmental Inventory and Analysis



The Importance Of Environmental Resource Analysis

Effective resource conservation in Dunstable requires understanding the problem from two perspectives: (1) the need to protect from development fragile or significant environmental resources; and (2) the need to regulate those areas which will be developed so that development does not result in environmental degradation.

Before this can be done, however, each landscape element needs to be analyzed to determine its geologic history, physical structure, functional role in the landscape, and vulnerability to human activities in the environment. Only then can a rational plan be developed which can recommend the most appropriate protection approach for each resource.

The aim of this section of the Dunstable Open Space and Recreation Plan is to provide the logical basis or reasons for the open space acquisition and development control proposals of the plan. This reasoning is based on the fact that all landscape elements have what can be called a "range of tolerance" which, when exceeded, results in environmental deterioration.

Improper development thus reduces the value of the landscape as a human resource. It results in flooding, lost recreational potential because of pollution of surface waters, the drying up or pollution of ground water resources, the disappearance of scenic streams in culverts and the impoverishment of soils through erosion and siltation. The end result is often an ugly landscape lost of its capacity to modify or cleanse itself of human excesses. This environmental analysis hopes to explain that with proper planning and citizen action, the mistakes of other growing communities needn't be repeated in Dunstable.

Climate

Dunstable is situated in the northeastern regional pattern of prevailing west to east atmospheric flow. Due to the origination of storms in a northwest to southwest arc, there is a great variation of local precipitation and temperature. Local differences in topography, elevation and terrain type also contribute to this variation.

The normal annual precipitation in Dunstable is 43.34 inches, the mean January temperature is 26.7°F and mean July temperature is 73.6°F. Annual snowfall is 66.5 inches. The frost-free season lasts about 5.5 months.

Geology, Soils, and Topography

Surficial Geology

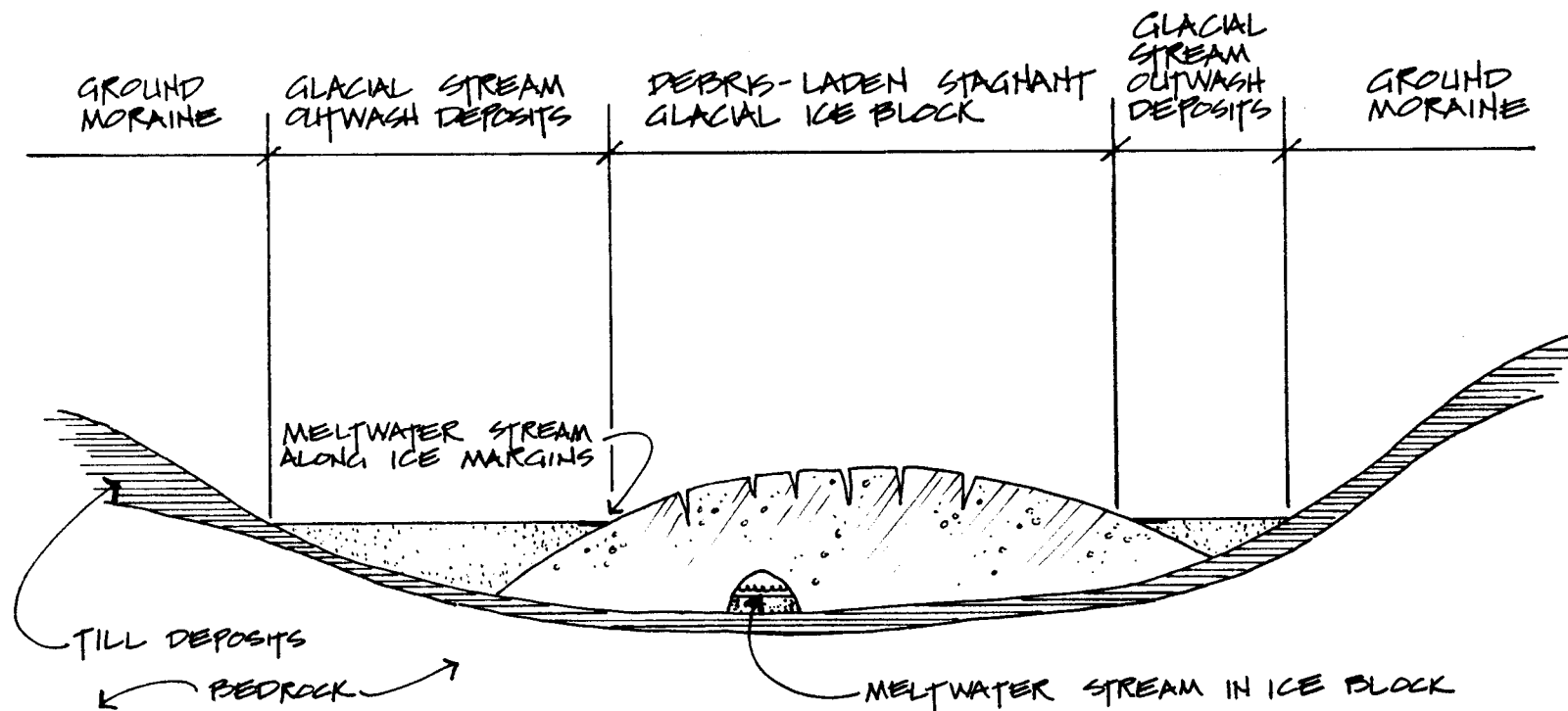
An analysis of Dunstable's natural resources logically begins with its geologic history. The surficial geology of the Town, created during the last two glacial ice ages, has been decisive in determining land forms, soils, water course direction and characteristics, and even types of vegetation and wildlife. Its surficial geologic features are the result of the Pleistocene Ice Age which occurred 15 to 25,000 years ago. The receding glacier deposited drift of varying depths on the granite bedrock, and glacial streams and lakes deposited finer material carried in these meltwaters. This area's geologic history has resulted in three

major types of glacial deposits: (1) direct glacial till deposits, (2) glacial stream deposits, and (3) glacial lake Nashua deposits.

Direct Glacial Till Deposits

Till consists of an unsorted mixture of sand, gravel, silt and clay, deposited directly over bedrock by receding glaciers. In Dunstable, this till cover varies in thickness from 100 feet to only a thin layer over exposed bedrock.

The land forms created in Dunstable by till deposits are of two types. The western sector has scattered drumlins, or oblong hills, running from northwest to southeast,



GLACIAL ORIGINS OF SALMON BROOK WATERSHED LANDSCAPE

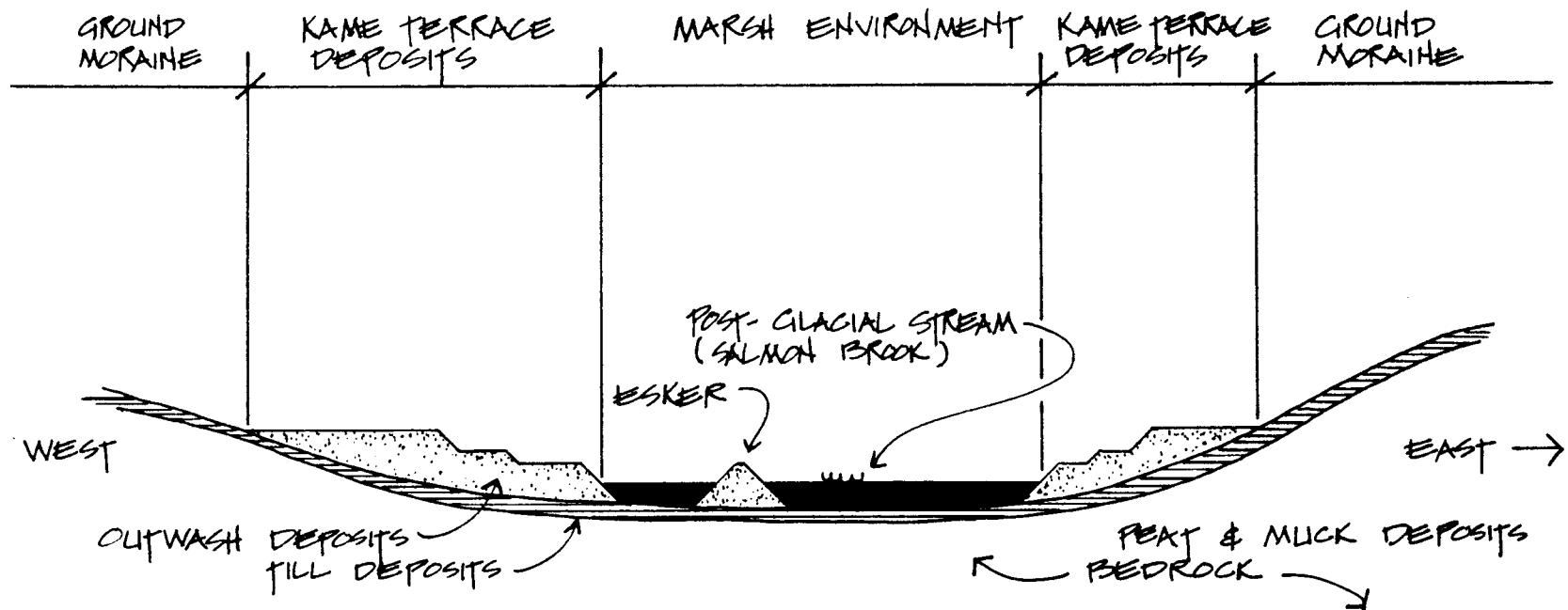
while in the eastern sector the deposits have resulted in a more massive topography of high rolling hills called ground moraine. The oblong form of the drumlins resulted from movement of the glaciers over bedrock exposures, with accompanying deposition of till material.

The composition of till material within Dunstable may vary considerably. Without a soil survey supplemented by field investigation, no exact analysis of composition can be made. There is evidence from U.S. Geologic Survey data that the drumlins may be composed of less resistant phyllite bedrock, with a high percentage of silty material with low permeability, as exists in the Blanchard Hill area.

Glacial Stream Deposits

These deposits consist of sand and gravel laid down by the action of glacial meltwater streams. These ancient water courses carried sorted till material from glaciers and glacial lakes, which were then deposited in sedimentary layers in formations such as eskers (steep ridges), kames (valley-side deposits), and deltas.

In Dunstable, these formations exist in the central north-south axis of town in a broad irregular band parallel to Salmon Brook. The older and coarser deposits lie at the southern end of town, with more recent and generally finer deposition occurring in the northern sector.



POST-GLACIAL SALMON BROOK WATERSHED LANDSCAPE

The older, southern deposits are also higher in elevation and show a more uneven topography than the northern formations. Kame deposits were created by the placement of outwash material over or against glacial ice, which later melted and caused the collapse of the structures. They are characterized by relatively level formations with at least one side steeply sloping.

Three formations especially prominent along the course of Salmon Brook are various kames, outwash plains, and eskers. Kame terraces are prominent east of Salmon Brook at the base of the till formations. They are characterized by “steppe” formations caused by changes in the level of the melt water in which this outwash was deposited. Eskers are long, steep-sided, often meandering deposits of gravel which were left by streams tunneling under glacial ice formations. They are prominent along Salmon Brook’s entire course in Dunstable.

Glacial Lake Nashua Deposits

Glacial Lake Nashua covered extensive areas of what is now the Nashua River watershed in Massachusetts and New Hampshire. Its highest elevation at any stage was probably 215 feet. Most of the lake deposits in Dunstable are flat lake bottom deposits of fine sand and silt in the Unkety Brook area, with some gravelly fluvial deltas adjacent to till areas, for example, in the River Street area. Meandering Unkety Brook and the extensive wetlands in western Dunstable are in effect the last stages of Lake Nashua.

Some of the streams in town are former meltwater spillways, which helped to empty Lake Nashua into the Salmon Brook watershed, cutting steep escarpments into the land as they did. Joint Grass Brook where it approaches Fletcher Street and the brook that flows from Horse Hill and parallel to Groton Street, just west of School Street, were such spillways.

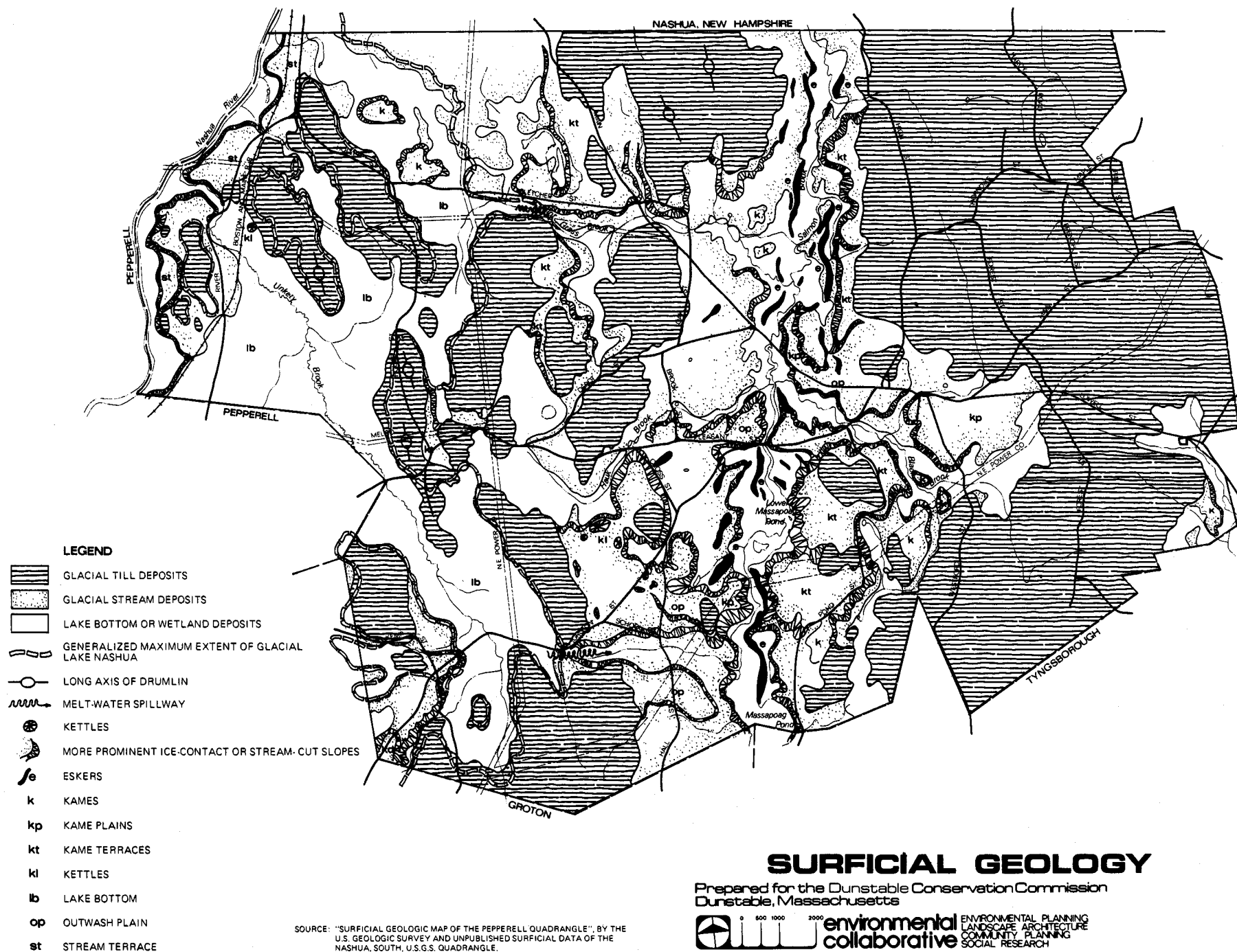
Surficial Geology and Resource Conservation

Because it sets environmental elements in an historical perspective, an analysis of the geologic structure of a community can be extremely valuable. From this perspective, for instance, wetlands can be seen not as isolated patches of wet land but as an integral part of a drainage network carved out of the landscape thousands of years ago.

The study of local surficial geology also establishes an understanding of the structural characteristics of various landforms, and the effect that man’s alteration may have on them. Because of the dense composition of till deposits, for example, leaching of septic tank effluent is difficult. This problem is compounded when both steep slopes and till material appear together in the landscape, since effluent is often deflected to the soil surface under these conditions.

Certain geologic formations are especially suitable as aquifer or ground water sources. This is true in general, of sedimentary deposits, but formations such as eskers tend to be especially productive of ground water because of the nature of the deposited material and their location relative to surface water bodies. Because of their steep slopes, these formations tend to be relatively sensitive to disturbance by man, and are therefore vulnerable. Not the least of the dangers to the eskers is the fact that they are highly prized sources of gravel. The site of the Tully Wildlife Refuge includes a former gravel operation on part of the esker that extends from the Salmon Brook valley northwest into Nashua, New Hampshire. Along a three mile stretch of this formation in Nashua, there were four gravel extraction sites.

It can be seen from this that geology places certain limitations on how the landscape of Dunstable should be altered. These limitations can be ignored, but only at a social and environmental cost to this and future generations of town citizens.



SURFICIAL GEOLOGY

Prepared for the Dunstable Conservation Commission
Dunstable, Massachusetts

Soils

Soil characteristics are perhaps the most important factor in guiding sound development policy for a community. This is especially true for a town such as Dunstable, which has a small public water system and no sewage disposal system. The soils of every building lot must provide wastewater treatment, and most lots must draw their own water supply from their soils as well.

Dunstable has detailed soils mapping prepared by the U.S.D.A. Natural Resource Conservation Service in draft form, showing the town's soils at the U.S.G.S. topographic map scale. This map accompanies an Interim Soil Survey that was published for Middlesex County in July 1995. This Interim Soil Survey has no mapping that shows soil types grouped by development limitations.

For this purpose, this updated plan shows the Soils Map prepared by the Environmental Collaborative, planners of the 1976 Open Space and Recreation Master Plan. They checked the 1924 Soil Survey (the only one available in 1976) against U.S. Geologic Survey surficial geology mapping, and created the accompanying soil map as the resulting composite.

Three major categories are shown, based on common characteristics. These are (1) hardpan soils (till types), (2) wet soils and (3) highly permeable soils (outwash types). Most of eastern Dunstable has hardpan soils laced with a network of wet soils, and sizable areas of hardpan are found throughout the western half of the town. Central Dunstable is largely composed of outwash soils surrounding the wet soil arteries along Salmon Brook and its tributaries. Outwash soils are also found in western Dunstable along the Nashua River and Unkety Brook, and wherever the bed of glacial Lake Nashua lay. Wet soils extend in a network throughout Dunstable, all along the circulatory system of its water bodies and water courses.

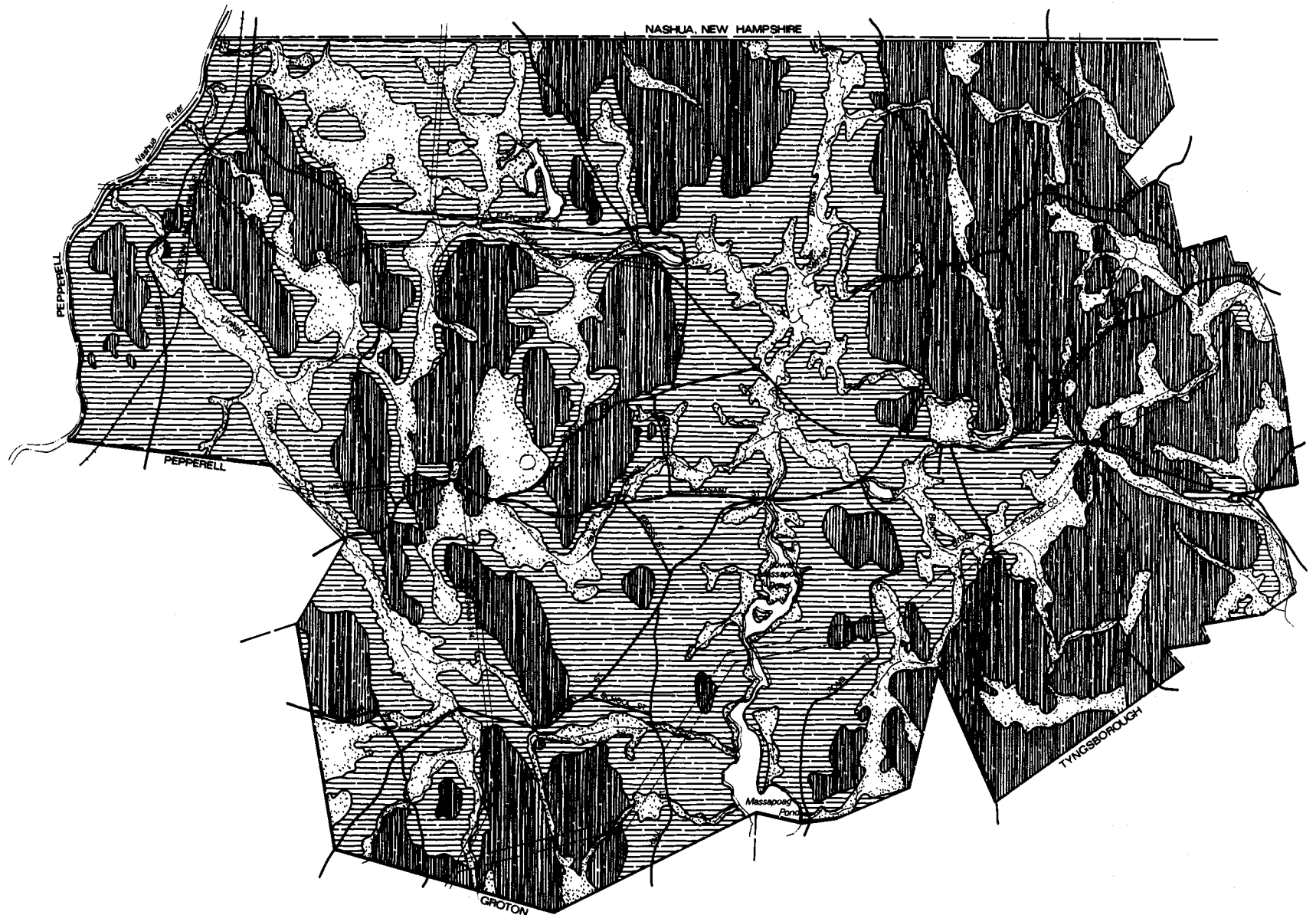
Hardpan Soils

Hardpan soils are the group of soil associations generally consisting of glacial till deposits, with occasional rock outcropping. From available information, the associations forming this group consist of well drained and somewhat excessively drained gravelly or rocky surface soils, with a hardpan, silt or clay layer, beginning at depths ranging from near the surface to 55 feet. This hardpan, silt or clay layer is slowly permeable and retards the downward movement of water. Because of hardpan and bedrock subsurface conditions, water tables in these soils are often near the surface. In addition, the greatest percentage of slopes over 10 percent occur within this group, compounding these soil problems.




The variation within this group is considerable — from rock outcropping to soils which are relatively free of large stones and which are still used for agriculture. An example of the latter is the Charlton soil association located in the relatively flat “H” shaped area at High, Thorndike, and Forest Streets.

Because of their often permeable surface layers, these till soils often easily pass percolation tests. It is only when hardpan soils become extensively developed that problems of effluent deflection to the ground surface and well contamination begin to occur. These results emphasize the fallacy of relying only on percolation tests to judge the suitability of soils for development.

The public health danger which results from development on these soils has required many communities to provide public sewage disposal facilities to these areas, resulting in ever more dense development in the remaining open land in the community. Dunstable's two acre zoning is designed to prevent this from occurring, since the lot should be large enough to relocate a leaching field. This was the rationale given by the Massachusetts Court of Appeals when it upheld two acre minimum lot zoning for the town of Sherborn.



LEGEND

-  HARDPAN SOILS
-  HIGHLY PERMEABLE SOILS
-  WET SOILS

SOURCE: "SOIL SURVEY OF MIDDLESEX COUNTY, MASS." BY W. J. LATIMER, U.S.D.A. 1929, AND PUBLISHED AND UNPUBLISHED SURFICIAL GEOLOGIC DATA OF THE U.S. GEOLOGIC SURVEY.

SOILS

Prepared for the Dunstable Conservation Commission
Dunstable, Massachusetts



environmental collaborative
ENVIRONMENTAL PLANNING
LANDSCAPE ARCHITECTURE
COMMUNITY PLANNING
SOCIAL RESEARCH

Wet Soils

For its mapping, the Environmental Collaborative defined wet soils as “those classified as muck or peat by the 1924 survey, those areas currently shown as wetlands on U.S.G.S. and on the town’s aerial photographs, and those areas which are most likely to have a water table within 3 feet of the soil surface.”

The 1995 Interim Soil Survey defines wet, or hydric, soils as those that are “saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions in the upper part”. In addition to muck, peat, and other obviously wet soils, hydric soils also include those that are poorly drained and have a frequently occurring water table at less than 1.5 feet from the surface for more than 2 weeks during the growing season. A further discussion of the attributes of wet soils may be found in the section on wetlands.

The difference in wet soils’ water table between the Environmental Collaborative (3 feet) and the 1995 Interim Soil Survey (1.5 feet) would mean that less area would be shown as wet soil today. However, the Soil Map is adequate for the purpose of this plan, since it is intended as a general planning tool to indicate possible soil limitations rather than an identification of “ground truth”.

In the western sector of town, wet soils are the final deposits of Glacial Lake Nashua. They represent the eutrophication or dying out of later glacial lakes and ponds remaining after the draining of the great lake. Hawk Swamp is an excellent example of this eutrophication process underway. Successive seasons of decaying organic matter built up deposits of muck and peat which vary in depth from 1 to 30 feet. Even though some soils are seasonally wet, they have been productive agricultural areas throughout Dunstable’s settlement. In the easterly section, the smaller, elongated peat deposits resulted from dammed up streams.

Because of the shallow water table and poor drainage charac-

teristics, wet soils are highly unsuitable for septic tank effluent disposal. A related type of soils are the seasonally dry soils of fine silt and sand which settled to the bottom of Glacial Lake Nashua. They are characterized by flat topography, a high water table in the lower elevations, and low permeability because of high silt content. Because soils of this type tend to have bands of sand and silt or admixtures of both, and because of the unevenness of the water table due to this and topographic characteristics, these soils vary considerably in their suitability for septic tank leading fields. A High Intensity Soil Survey would be needed to differentiate those areas which are suitable for this purpose.

Highly Permeable Soils

Highly permeable soils include the Merrimack and Hinkley soil associations. They are the gravelly and sandy soils deposited by Glacial Lake Nashua in the western sector and by glacial streams in the Salmon Brook area. They are well drained soils free of hardpan and have a relatively low water table. Because of their high permeability, they have tended to be too dry for many agricultural uses. Extensive areas of these soils are characterized by flat terraces ending in abrupt, steep hills. These are the kame formations mentioned earlier.

Because these soils are both highly permeable and have flat or gently rolling topography, they are the most suitable soils for residential development. They also represent the most productive ground water aquifer deposits because of their permeability, transmissibility, and location adjacent to surface water recharge areas.

Where slopes exceed 10 percent within this soil area, precautions should be taken to assure that wells do not become contaminated by the underground seepage downslope of effluent, or, on level ground, the contamination of ground water due to rapid percolation in the coarser ranges of these soils.

Soils and Resource Conservation

Soil characteristics should be one of the most important factors in governing future development in Dunstable. Whether soils attain this importance, however, depends on the degree to which the town adopts sufficient safeguards to assure that future development occurs where the land is capable of absorbing it without negative impact.

Among Dunstable's outstanding soil resources are the sizable areas of prime and significant farmland soils found throughout the town. An analysis of the 1989 Soil Survey reveals that nearly one quarter of the town may be in this category, with extensive areas of prime soils near the Nashua River and on the western border, in Dunstable's geographic center, and in the northeastern and southern parts of town. Whenever the opportunity arises to permanently protect these prime soils for agricultural use, the town and state should invest in Agricultural Preservation Restrictions (APRs) so that farmland can continue to be farmed forever. By providing the physical basis for a viable agriculture, these soil resources form the foundation of Dunstable's rural character.

Topography And Slopes

An analysis of topography can yield important information useful in resource conservation. It tells where flooding is likely to occur, where slopes may be too steep for development, the visual impact of development, and through land forms, determines to a great extent the functional characteristics of soils.

Topographic Characteristics

Topography in Dunstable varies from approximately 150 feet above mean sea level in the extreme southeast corner of town to 390 feet atop Forest Hill nearby. As shown on the accompa-

nying topographic map, the western and central parts of town are characterized by generally flat topography, with drumlins providing isolated relief in elevation. The eastern sector of town is more varied in topography due to the extensive bedrock and glacial till conditions here.

Topography under 200 feet in town is generally flat, and contains most of the town's wetlands and water courses. This area was formed either by lake bottom deposits of Glacial Lake Nashua or through deposition of glacial streams. Most of the area, if not actually wet part of the year, has a high water table.

However, topography adjacent to Salmon Brook ranges from 154 to 200 feet. This area is more varied in land form type, and, except on the valley floor wetlands, is less likely to have a high water table, due to its geologic history. The eskers and kame terraces here provide a variety in elevation and are composed of very porous gravel deposits, unlike the more silty, organic deposits in the lake bottom and wetland areas.

Topography from 200 to 250 feet is more pronounced in steepness, except on the flat kame deposits adjacent to Massapoag Pond and Black Brook.

Those areas above 250 feet are more pronounced in steepness, except in sectors at the base of Kendall Hill and Forest Hill. The area is composed of bedrock and till deposits, although in some level areas, the till has been sufficiently free of boulders to allow tilled fields. Some wetlands here are perched as high as 280 feet, as at the base of Forest Hill.

Slope Characteristics

As is evident from the map showing slopes in Dunstable, a considerable portion of the town has topography with slopes of 10 percent or more. The map shows two ranges of slope steepness: 10-30 percent and over 30 percent.



LEGEND



AREAS WITH SLOPES AT 10-30%

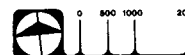


AREAS WITH SLOPES EXCEEDING 30%

SOURCE: U.S.G.S. TOPOGRAPHIC QUADRANGLE MAPS.

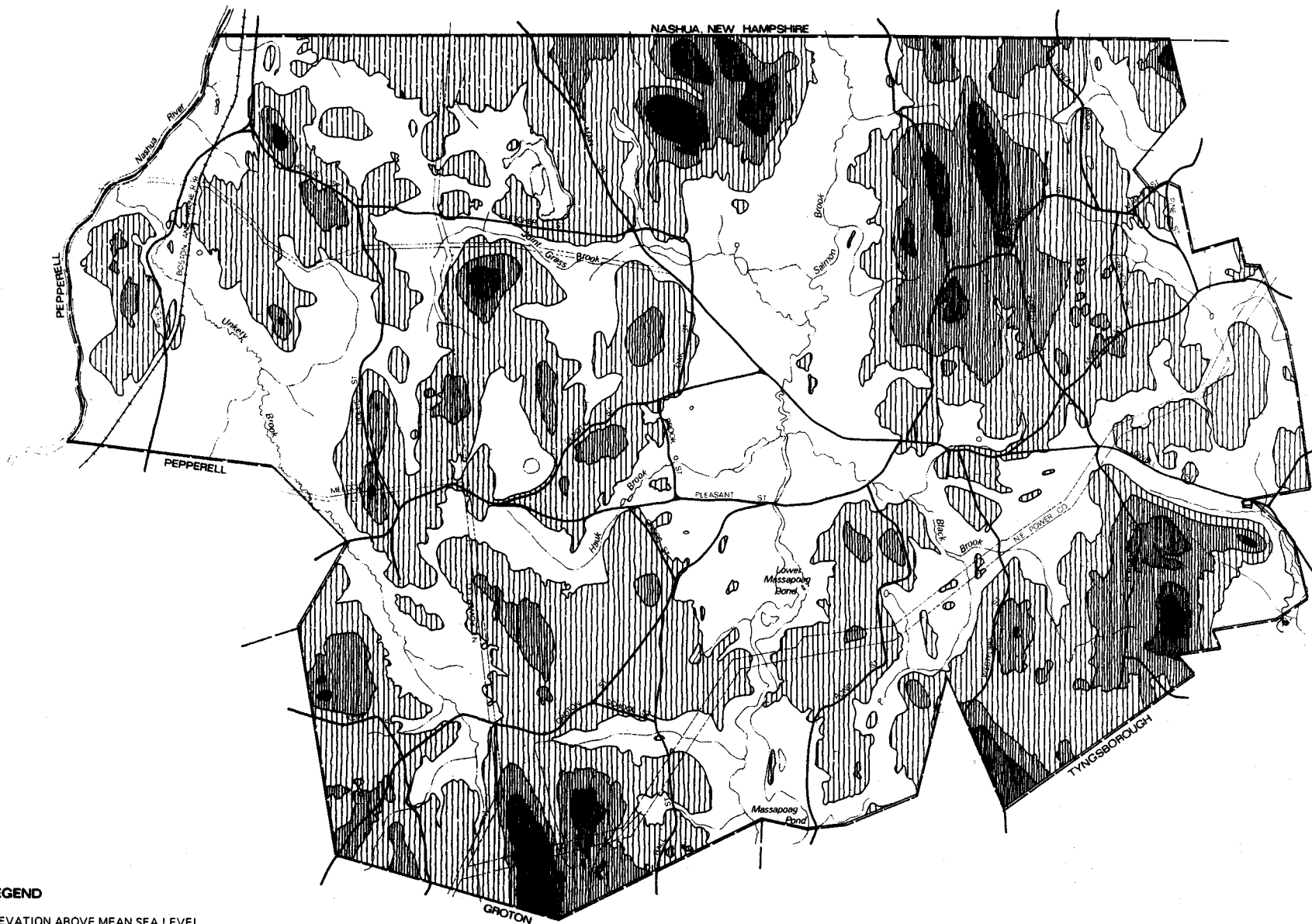
SLOPES

Prepared for the Dunstable Conservation Commission
Dunstable, Massachusetts



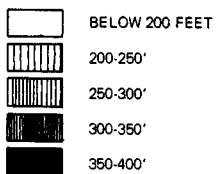
environmental
collaborative

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LANDSCAPE ARCHITECTURE
COMMUNITY PLANNING
SOCIAL RESEARCH



LEGEND

ELEVATION ABOVE MEAN SEA LEVEL



SOURCE: U.S.G.S. TOPOGRAPHIC QUADRANGLE MAPS

TOPOGRAPHY

Prepared for the Dunstable Conservation Commission
Dunstable, Massachusetts



environmental collaborative
ENVIRONMENTAL PLANNING
LANDSCAPE ARCHITECTURE
COMMUNITY PLANNING
SOCIAL RESEARCH

Slopes greater than 10 percent present problems for development because of the potential difficulties in siting septic tank filter fields. The U.S. Soil Conservation Service advises that on slopes greater than 10 percent, trench-filter fields become difficult to lay out and construct and that seepage beds become impractical. In addition, effluent from the septic system seeps to the soil surface downhill from the system due to the short distance from the trenches to the downhill side. This condition is even more likely to occur when there is bedrock or a layer of hardpan near the soil surface, which would tend to deflect the effluent laterally to the surface. This combination of slopes, poor soils, and bedrock exists in upland till areas such as Blanchard Hill.

Slopes with gradients greater than 30 percent present not only obvious problems for septic system disposal, but are generally difficult and expensive to build on. The cutting and filling necessary to site roads and dwellings requires disfiguring the landscape to a greater extent than would be required in more level areas. Since bedrock is often exposed or near the surface on these slopes, the cost to the town or developer of trenching utilities here can often be prohibitive.

In addition to classifying slopes by degree of steepness, they can also be divided by soil composition. Most slopes shown on the map are composed of glacial till overlying bedrock. The elongated, swirling slopes shown along Salmon Brook and the Nashua River, however, are different in composition. They are the slopes of eskers, kame terraces, and stream terraces and are composed of sedimentary sand and gravel deposits. Because of this, these slopes are far more vulnerable to disruption than the more consolidated slopes of glacial till. These deposits may also present a severe septic effluent deflection problem when they overlay bedrock or slowly permeable till material. Because of their vulnerability and strategic location adjacent to the town's main streams, they deserve high priority for protection.

Topography And Resource Conservation

Topography is critical in resource conservation planning because of its influence on the flow of water in the landscape. This is true not only of surface water but ground water as well. In the upland hilly areas of Dunstable, both steep slopes and impermeable soils cause quick runoff downstream. Because development will bring with it more hard surfaces and increased rates of runoff, future development controls in these areas should stress techniques of holding back peak storm water runoff through retention basins or other methods. Those wetlands which are "perched" within these upland areas should be protected to assist in decreasing the velocity of peak runoff through localized flooding of these areas.

In the flat low-lying areas of town, particularly those areas adjoining Salmon Brook and Unkety Brook, water has opposite characteristics. Here water is more slow moving and tends to spread out over the landscape during peak flows. This is the path of least resistance for the water because of low embankments and flat topography in this area. This flooding action is nature's safety valve, allowing excess water to be absorbed by the landscape and thus decreasing damage-causing high velocities during peak flows.

In this landscape, sound development controls dictate allowing this safety valve to remain, and therefore preventing encroachment on it. Here, the controls should allow space in the landscape for flood waters to harmlessly expand across the land, whereas in the upland areas the objective is to hold back any additional runoff caused by development through methods which in a sense induce localized flooding.



Landscape Character

Dunstable's winding roads traverse a traditional New England landscape, with its tapestry of stone-walled fields, forested rolling hills, rushing brooks and placid millponds, and those handsome emblems of long-standing human use of the landscape — old barns and classic farmhouses framed by venerable shade trees. All these elements form Dunstable's rural character, prized by those who live here.

The visual character of Dunstable is one of its most priceless assets. The pattern of forests and farm fields, of hills and lowland, gives it variety and beauty. Mostly by luck, the town has escaped major suburbanization so far. Its older buildings remain as major man-made focal points in the landscape.

Because of this rural character, new residents are attracted to the town. Paradoxically, the additional families moving into the town may be instrumental in destroying the character they came to enjoy, if development is not carefully designed. Yet new families can also be instrumental in protecting the town's character by getting involved in open space conservation.

In general, the recommendations in this report will assist in preserving much of this character by protecting specific areas or by controlling the development patterns on certain lands.

Character Elements: Openness and Enclosure

The major scenic character elements are those which give a feeling of openness (fields, marsh, surface water bodies), and those which are areas of enclosure, e.g., woodland, stone walls, hills, meandering roads. Each has its own qualities which call for different approaches in preserving its visual characteristics. In addition to these are those built up areas of town which either have or lack distinguishing character.

The open areas of town are most visually fragile because any development which occurs is clearly visible. This is important because those soils which are now tilled for farming are often those which are most suitable for septic tank effluent disposal, and therefore most lend themselves to residual development. The often precarious economic condition of farming can result in the selling of fields for development.

Open marsh can be effectively protected, but its contiguous upland does not have similar protection under the Wetlands Protection Act. Areas adjoining marshes should be conserved because they form an integrated unit with the marsh, protecting its water quality, wildlife habitat, and its scenic character.

For the same reasons, shoreline protection should be applied to open surface water bodies. The health of many water bodies depends on their having a naturally vegetated shoreline buffer. The pressure to develop pond shorelines is intense, since they are considered prime lots. This is true even when the pond is too small to have much recreational value, as at Sweet's Pond.

Areas of enclosure are primarily woodland which abuts roads, along with stone walls, hills and meandering roadways which reinforce this sense of enclosure. The threat to the visual quality of these areas is that roadside strip residential development will remove a substantial amount of woodland and stone walls which abut the town's existing roadways. The result will be the monotonous repetition of suburbanization which individually the new home owners came to escape but to which they will contribute. Since development on existing roads is not subject to subdivision regulation, other means of preserving the visual integrity of existing roads need to be found.

Dunstable's many hilltops — Blanchard, Drake, Forest, Horse, Nuttings, Spectacle — are a cherished framework for its rural landscape. Time and again, in community meetings for the 2020 Vision for the Nashua River Watershed and for this Open Space and Recreation Plan, these hills have been named as important resources to protect. Dunstable's hills are recognized as key elements of the landscape. Views of these hills are as important as views from the hilltops. Because of their visibility, development of these hilltops has the potential to be very detrimental to the integrity of the rural landscape. They are vulnerable to development, because most are not so steep as to preclude accessibility.

Goals for Preserving Scenic Areas

The various types of scenic areas in Dunstable require differing approaches to assure that they receive adequate protection with the resources that the town has available. Following are the more critical areas which deserve protection controls.

1. Protection of hilltops as natural areas free from development. Hilltops can be named in Dunstable's cluster ordinance as resources that the town would like to have set aside as open space in cluster developments. Dunstable could also establish a Steep Slope Conservation Zoning District, defining areas where there are a prevalence of slopes greater than 15%, for instance, and requiring that development of land in this district be by special permit only. This would not prevent development of these areas, but could give some control over environmental impacts. The only certain way to protect the town's hilltop views is through conservation acquisition.

2. Protection of scenic roads through preservation of shade trees and stone walls. To adequately protect the visual integrity along these roads, it would be ideal if there were a Greenway at least 100 feet wide on each side, except for access to the lot or subdivision. Scenic easements offer a method to accomplish this. In addition to their scenic value, these easements could contain bicycle paths and bridle trails, as well as be used by pedestrians. They can thus serve a safety and recreational use as well as scenic. Since they will have an extensive ecotonal edge, they could also be valuable wildlife habitats.

The state law governing protection of scenic roads (Ch. 40, Sec. 15c) provides only for town board review of any alterations within the road right-of-way and immediately contiguous areas. The law excepts state highways from these controls.

3. Preservation of open fields. Fields can be vulnerable to be developed as homesites because tilled fields are generally on permeable soils. Conservation acquisition of fields up for sale

may be very expensive. The most reasonable approach to their protection would be to encourage continuing agricultural use.

One way to keep land in agricultural use is through Agricultural Preservation Restrictions (APRs). With APRs, the Massachusetts Department of Food and Agriculture purchases the development rights from farm families so that they can realize the development value of their land while the land remains as farmland forever. In this way, new generations of farmers can afford to buy the land and continue to farm it, because it no longer has development value. There are many demands for APR funding state-wide; local contribution towards APRs in the town may leverage state funds.

At present, most of Dunstable's land in agricultural use is classified under Chapter 61A, an excellent measure that reduces the assessment on farmland, recognizing that this land use demands far less tax investment for services than does residentially developed land.

Because there are so many Chapter 61A lands, it would be wise to plan for future acquisition of land or APRs on some of these properties before they may come on the market. The law gives municipalities a 120-day option to purchase Chapter 61A lands that are for sale. The first steps would be to establish a fund dedicated to this purpose, and to set criteria for the types of lands that would be priorities for acquisition.

Some possible acquisition criteria should be: prime farm soils; an evaluation of the property as a key element in the town's rural character, either through its size, its visibility from town roads, its pattern of land use; the property contains other resources noted as important to protect in this plan, such as aquifers, water bodies, floodplains, rare species habitats, hill-tops.

If farm properties are purchased by the Town, there could be a lease-back arrangement with the present or new owner to pro-

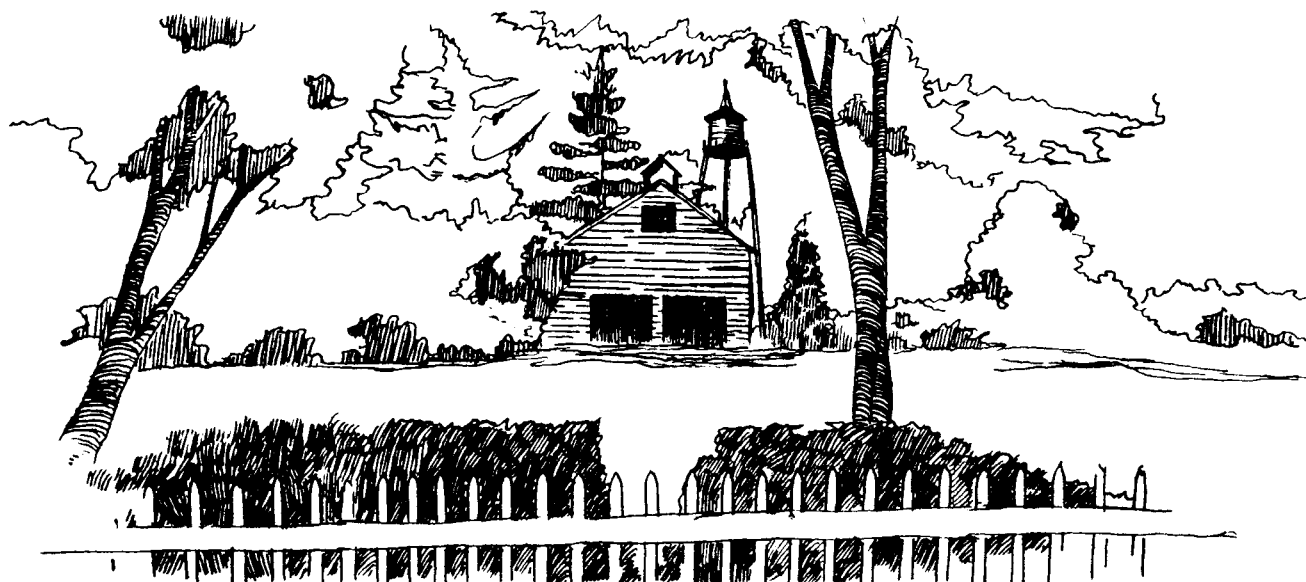
vide sufficient income to retire the bond issue floated for land purchase. The town could also lease rights for recreational uses which would preserve open fields, for example, a riding stable and its contiguous pastures.

4. Protection of shrub marsh and pond shorelines from development. This can be done through zoning for setbacks or through acquisition of easements or fee simple title of the wetland and adjoining upland. Towns have authority to establish their own river, pond, and stream protection bylaws, which can protect shoreline buffers more thoroughly than is possible under the Wetlands Protection Act.

5. Preservation of scenic quality in new residential developments. This can be accomplished through subdivision control, the cluster development and zoning provisions. The formation of a design review board could raise the general quality of subdivision site design. Issues to be addressed in these regulations include the preservation of some of the site as public land, limitations on development where visibility is high, e.g. on hillsides, woodland to be cleared or preserved, building setbacks. The cluster development ordinance can be designed to allow flexibility in site planning to protect scenic resources.

6. Protection of historic sites. Parts of Dunstable, the town center in particular, are well worth protecting through the formation of a historic district. This would prevent new incompatible uses or incompatible alterations of existing structures.

7. Access to scenic areas. Many areas of Dunstable with scenic value presently have little public access. This is true of places such as the Nashua River corridor. Public access to these lands would add to the appreciation of Dunstable's scenic values.



Water Resources

Surface Water

Water resources in Dunstable consist of the various forms of surface and subsurface water: ponds, rivers, brooks, wetlands, and aquifers and other groundwater sources. All of the water which falls on Dunstable eventually drains into the Merrimack River, approximately one and a quarter miles east of the town's easterly border. The town's drainage pattern can be subdivided into three smaller watershed areas. These drainage areas have distinctive land form characteristics and stream types: (1) the Nashua River watershed, (2) the Salmon Brook watershed and (3) the Eastern Upland watershed.

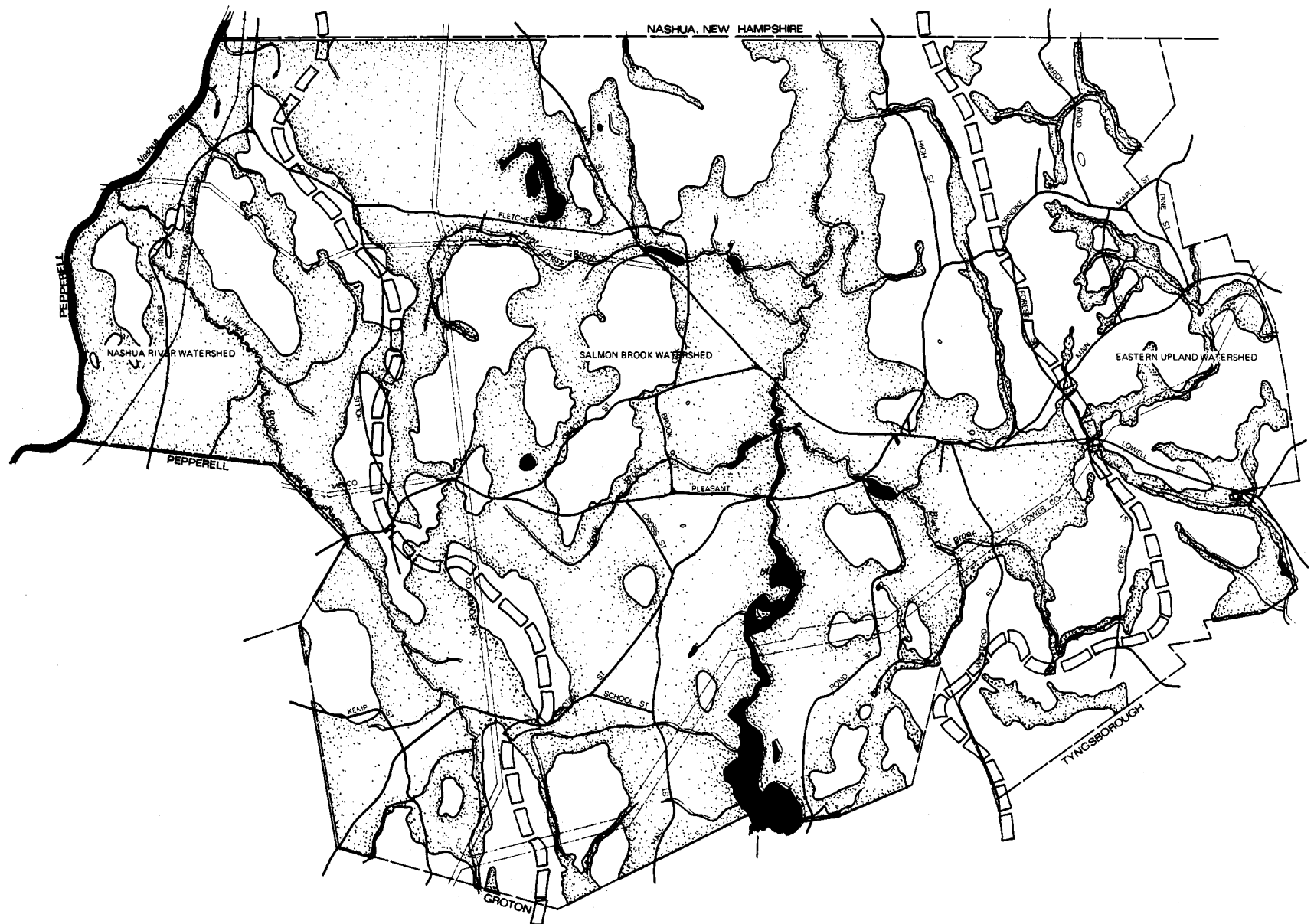
Nashua River Watershed

The Nashua River watershed covers an area in Massachusetts and New Hampshire of 538 square miles in 31 communities. Dunstable's percent of this watershed is quite small. Unkety Brook is Dunstable's main tributary to the Nashua River. The watershed of Unkety Brook draining into the Nashua River





from Groton and Dunstable is approximately 2,000 acres.

That part of the Nashua River watershed which lies within the western part of Dunstable has generally flat topography, relieved by several drumlins scattered throughout the area. During the glacial era, Glacial Lake Nashua covered this area, except for the exposed drumlins. The greater part of the watershed consists of lake bottom deposits of sandy gravel and wetlands. Water runoff characteristics are therefore moderated by the absorption of excess runoff by these wetlands and porous soils. During peak runoff periods, as in early spring and flash storms in summer, the soil characteristics of this watershed are capable of absorbing this excess as groundwater and discharging it back into streams at a moderate rate.

Most of the watershed is in mixed hardwood/softwood forest, with scattered agricultural use. Residential development is concentrated in the Groton Street area, in the southwestern part of town, along Pleasant Street, and Hall Street.



LEGEND

-  AQUIFER RECHARGE AREAS
-  STREAMS
-  PONDS
-  WATERSHED BOUNDARIES

WATERSHEDS

Prepared for the Dunstable Conservation Commission
Dunstable, Massachusetts



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The Nashua River is a meandering stream of relatively low velocity, which some geologists attribute to its northward “uphill” movement against the general direction of the region’s topography. The Nashua River is almost “invisible” within Dunstable, since no roads in town cross it or even closely approach it. Because it has cut steep embankments into the alluvium and glacial stream terrace deposits, the river tends to be hidden from view. These embankments consist of steep escarpments approximately 15 feet high—but often reaching 30 feet—which extend immediately into the river. These flat delta deposits consist of sand and sandy gravel, and are quite vulnerable to erosion by river flooding.

No longer does the river suffer from large scale discharges of untreated domestic sewage and industrial waste. The “murky brownish-green color and noxious odor” noted in Dunstable’s 1976 Open Space Plan are now gone. The Nashua River generally meets the standards for its Class B water quality classification along this stretch, thanks to the 11 new, enlarged, and improved wastewater treatment plants that have been constructed upstream over the past two decades. However, the Nashua River continues to be vulnerable to pollution caused by malfunctions at the wastewater treatment plants, and by non-point sources of pollution. Surface runoff from streets is one of these non-point sources of pollution, contributing substantial sediments as well. Concentrations of development based on septic systems can also cause pollutants to leach into tributaries. These negative effects could be lessened, however, through proper development controls.

The free-flowing stretch of the Nashua River that passes by Dunstable is attractive for canoeing, with a launch in Pepperell upstream and take-out in Hollis, NH, downstream. An access to the Nashua River in Dunstable has recently been acquired by the Mass. Division of Fisheries and Wildlife. So far this is the only piece of public land on Dunstable’s stretch of the Nashua River. Ongoing efforts to conserve land here should

continue. Access to the Nashua River has been indicated as a community need.

Unkety Brook meanders slowly through its course in Dunstable, has a low embankment, and is bordered by wetlands for most of its length. Its tributary streams are relatively short and drain adjoining wetlands. Because of the existence of wetlands and permeable soils here, the brook has a generally steady seasonal flow.

Fishing and nature study are the main forms of recreation in Unkety Brook. There is access to Unkety Brook at Pleasant Street at the town’s Gardner Conservation Area, and at Groton Street at the Dunstable Rural Land Trust’s Unketyasset Brook Meadow. A Greenway is growing along Unkety Brook, thanks to the Dunstable Rural Land Trust, which holds 47 acres of brookside land, and to the Conservation Commission, which holds 156 acres on the brook.

Protection of the Nashua River watershed within Dunstable should concentrate on

- (1) protection of the river embankment and adjoining flood-prone areas,
- (2) preservation and protection of those watershed characteristics which reduce flooding, especially of wetlands adjoining Unkety Brook and its tributaries,
- (3) adoption of development controls which will modify peak runoff and lessen the danger of pollution.

The Nashua River Watershed Association’s long range plan, the 1995 to 2020 Vision for the Nashua River Watershed, analyzes the watershed’s resources and makes recommendations for protecting the water quality and open spaces of the watershed while using its land carefully. Many of these recommendations have been adopted in this report, and made more specific in their application to conditions existing in Dunstable.

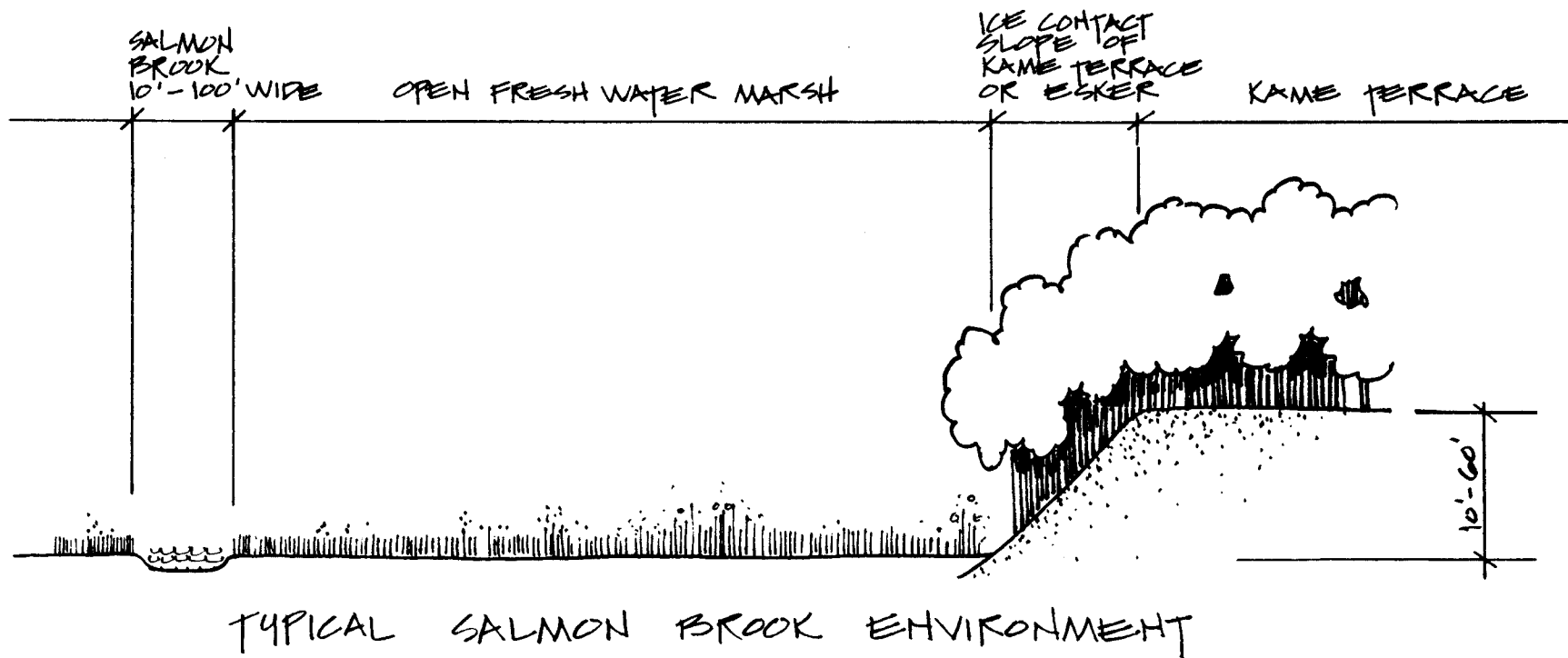
Salmon Brook Watershed

Salmon Brook meanders through the center of town from Massapoag Pond in the south to the New Hampshire border in Nashua. Its watershed covers the greater part of town, including that part of town which has been most developed. Salmon Brook is a slowly running stream, with a considerable volume even in dry periods. Its main tributaries in Dunstable are Joint Grass Brook, Hawk Brook and Black Brook. These streams originate in the upper till and wetland areas of the watershed, and generally have a greater velocity and more seasonal flow.

The soils within the watershed consist of bedrock and till in the drumlins in the west and upland areas in the east, and

glacial stream outwash soils in the low-lying areas. These soils were formed by receding glaciers, south to north. During this time Salmon Brook was probably a south-running brook, but changed direction as a lower outlet was opened up further north, into the Merrimack River.

Because these glacial outwash deposits are highly permeable, much of the watershed is an aquifer recharge area, that is, an area which collects surface water and filters it into the soil as ground water. These same areas, of course, tend to be highly productive of ground water for domestic and municipal wells. During seasons of excess rainfall, water is absorbed from the Brook and its tributaries, then released at a moderate rate when peak runoff conditions have subsided. Because of the



permeable soils adjacent to this water course and Massapoag Pond, it is highly vulnerable to being polluted by residential development along the pond shoreline. This is particularly true of the Tyngsborough part of the shore.

The few standing bodies of water which exist in Dunstable are located within the Salmon Brook watershed. The only major water body in town is Massapoag Pond, which extends into Tyngsborough and Groton. Its embankment is characterized by steep, high slopes of kame terrace deposits and eskers. Lower Massapoag Pond is smaller and more elongated in character, with a shoreline of primarily shrub marsh wetland. Smaller ponds along the three main tributaries were formed by damming during the last two centuries for various economic purposes. A new pond in the northwest corner of the watershed was formed by gravel operations, and left as part of town-imposed land reclamation when operations ended.

The main water-based recreational activity in this watershed is swimming and boating in Massapoag. The Lowell YMCA has a summer camp on the western shore of Massapoag Pond in Dunstable. Homes occupy much of the remaining shore, but some shoreline is undeveloped. There is no formal public access to the pond in Dunstable.

Salmon Brook is used for fishing and canoeing. There is access to the Brook at Pleasant Street at Spaulding-Proctor Reservation and at Main Street at Sargent Conservation Area, with a take-out at the Arched Bridge Conservation Area on High Street. The Spaulding-Proctor Reservation, town-owned conservation land, borders all of the westerly shore of Lower Massapoag Pond and provides access to this pond and the brook. Salmon Brook, with its unspoiled environment of marsh and woodland and its meandering nature, is an excellent stream for canoeing.

Formulation of a protection strategy for this watershed should consider that this area will probably absorb the major develop-

ment which is likely to occur in the town in the future. With this in mind, resource conservation strategy should emphasize

- (1) preservation of those landscape elements which will tend to modify flooding and polluting of the watershed's streams,
- (2) development controls and acquisitions which will preserve the visual integrity along the watershed's streams and ponds,
- (3) protection of ground water aquifers and critical recharge areas, and
- (4) provision of adequate public access to all of the water resources existing within the watershed.

Through its acquisition program, the Conservation Commission has strongly emphasized protection of this valuable watershed resource. A Greenway along Salmon Brook is growing. More than 87 acres have been added since the 1976 Plan was completed, with the Kennedy, Arched Bridge, and Goldthwaite Conservation Areas, the Livrakis Conservation Easement, and the New Town Wellfield.

Eastern Upland Watershed

The upland till area of Dunstable is drained by three intermittent streams which flow into Locust and Flint Ponds in Tyngsborough. Because soils in this watershed are generally slowly permeable, wetlands small in area, and slopes generally steep, water runoff characteristics are relatively fast.

As the area develops, the impacts will be quicker in coming than for the other watersheds. Because of this, and because soils in this area tend to be hardpan types with limitations for septic systems—complicated by slopes—protection strategies should emphasize:

- (1) development controls which limit construction to hazard-free areas,
- (2) controls which regulate peak discharge of storm water, and

(3) preservation of wetlands as natural storage basins and pollutant modifiers.

Flood Hazard Areas

The Flood Prone Areas map shows extensive floodplains along Dunstable's three major streams: the Nashua River, Unkety Brook, and Salmon Brook.

Nashua River

During extreme floods, the river overflows high embankments and inundates the flat delta areas. However, each spring the river floods to a lesser extent, steadily undercutting the embankment when it does. The substantial tree growth along the river embankment has prevented this erosion from being too extensive, but flood waters still undercut the vegetation at the roots. Fallen trees in the river testify to the steady erosion which occurs during spring flooding periods.

The principal cause of flooding along the Nashua, and in New England generally, is runoff from melting snow in late winter and early spring. This melting is greatest during heavy spring rains, when the ground is still frozen and cannot absorb the excess runoff. The worst such storm was recorded in 1936, but flooding occurs yearly with varying severity. Hurricanes are also a source of flooding conditions, especially when accompanied by wet autumns, when the soil is already saturated. Severe storms of this nature occurred in 1938, 1954, and 1958.

There are two non-seasonal factors which contribute to flooding in the Nashua watershed: soil conditions existing in the drainage basin area and the extent of development. Because extensive areas west of Dunstable consist of glacial till and bedrock deposits, runoff from tributary streams into the Nashua River is faster than if the watershed consisted more of wetlands and porous soils. In essence, this means that because

of its unique geologic characteristics, the Nashua River is probably more prone to flooding than streams with more favorable soil characteristics.

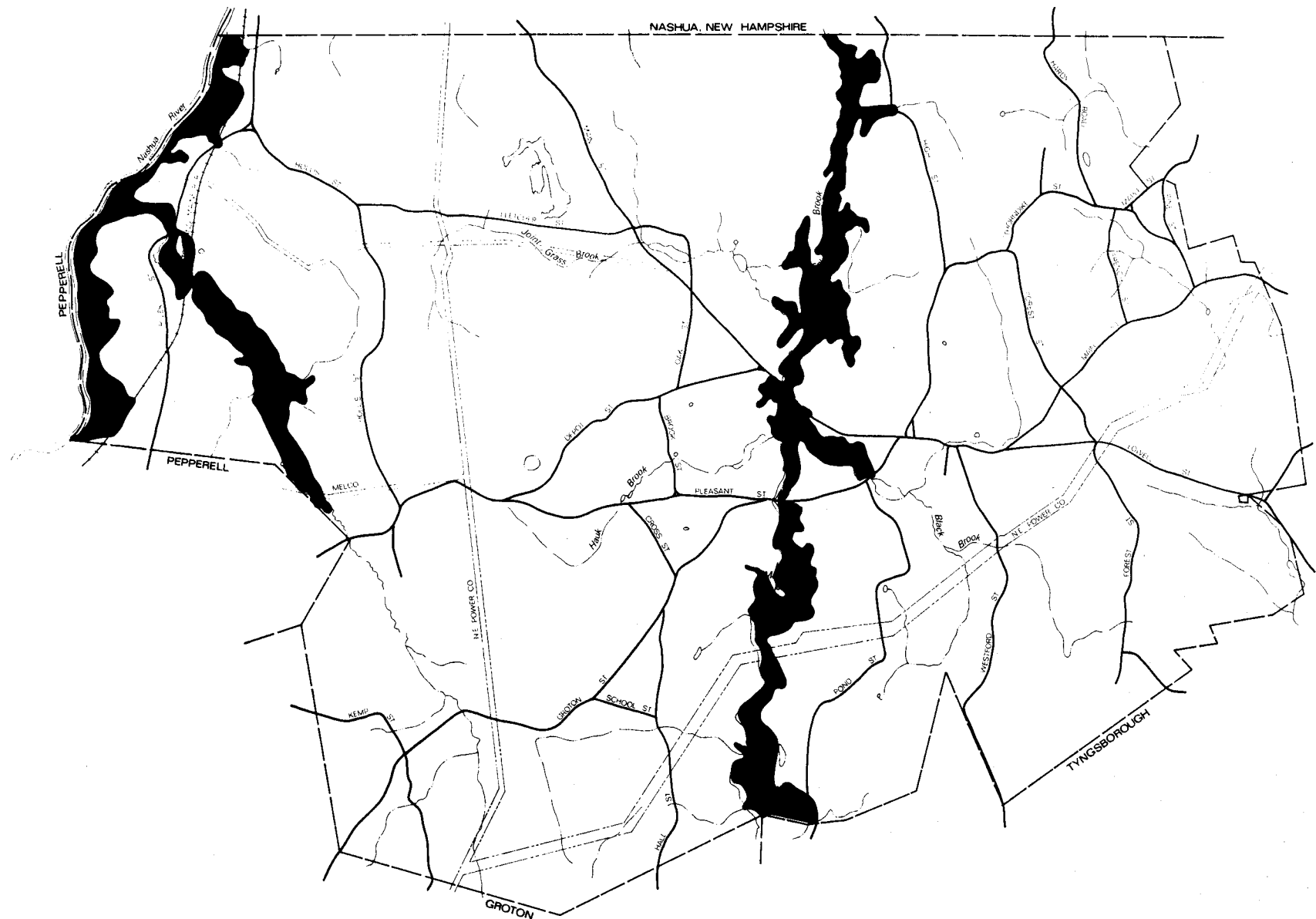
Perhaps the greatest single factor governing the future extent of flooding on the Nashua is the development which will occur in the watershed. As development increases, the natural cover which now modifies water runoff—soils, vegetation, wetlands—will be destroyed and replaced with paving or buildings. Because runoff from these surfaces is much quicker than from natural surfaces, increased development without runoff controls will be accompanied by more frequent and severe flooding.

Unkety Brook

When Unkety Brook floods west of the Nashua Valley Railroad Trail, this is usually due to backing up from the Nashua River flooding rather than the brook. The brook itself has an extensive floodplain along the broad wet meadows that border it.

Salmon Brook

Salmon Brook floods its adjoining marshes during periods of serious spring flooding. These marshes provide a natural storage basin for excess water during these periods, without damaging natural formations or man-made structures. As development occurs in Groton, Tyngsborough and Dunstable, however, the probability of damaging floods will increase. The extent of flood damage will depend on wetlands preservation and development controls regulating storm water runoff. Wetlands now serve as natural retention basins; their reduction means a corresponding reduction in the capacity of the land to resist flooding. Development controls can prevent construction in flood-prone areas, and can assure that new subdivisions provide a means to restrict peak storm runoff.



NASHUA, NEW HAMPSHIRE

PEPPERELL

PEPPERELL

MELCO

N.E. POWER CO.

GROTON

TYNGSBOROUGH

FLOOD PRONE AREAS

Prepared for the Dunstable Conservation Commission
Dunstable, Massachusetts

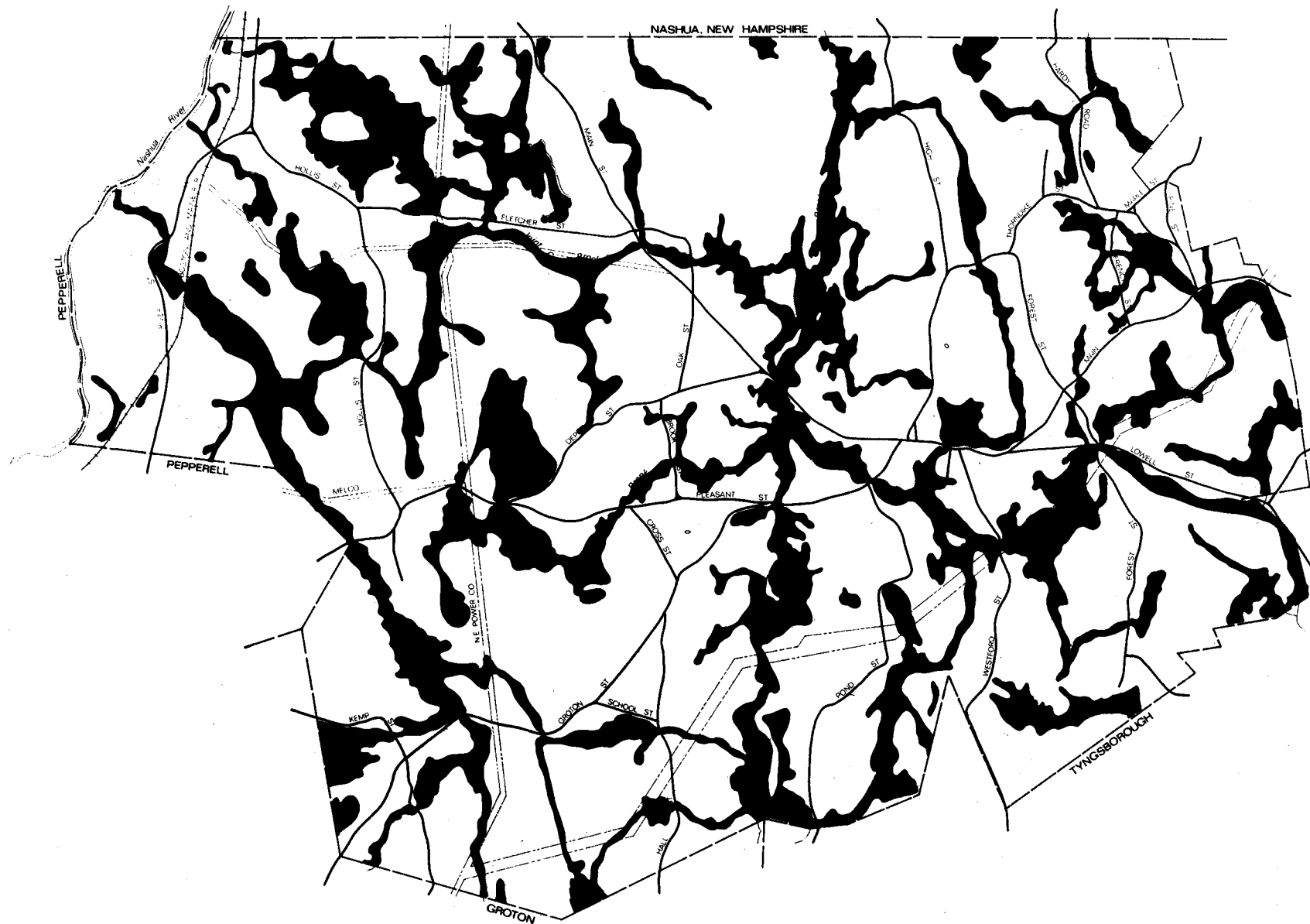


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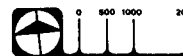
SOURCE: "MAP OF FLOOD PRONE AREAS". PREPARED FOR THE PEPPERELL AND
NASHUA SOUTH QUADRANGLES BY THE U.S.G.S., 1969.

AREAS DEFINED BY THE U.S. GEOLOGIC SURVEY AS "OCCASIONALLY FLOODED"



WETLANDS

Prepared for the Dunstable Conservation Commission
Dunstable, Massachusetts



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SOURCE: U.S.G.S. TOPOGRAPHIC QUADRANGLE MAPS, WITH VERIFICATION FROM AERIAL PHOTOGRAPHS BY ENVIRONMENTAL COLLABORATIVE. NOTE: SINCE THESE BOUNDARIES WERE NOT ESTABLISHED BY STEREO PHOTO-INTERPRETATION, WETLAND BOUNDARIES SHOWN SHOULD NOT BE ASSUMED TO BE AS ACCURATE AS FROM SUCH INTERPRETATION.

WETLAND AREAS

Wetlands

Although part of Dunstable's water resources, wetlands deserve separate consideration because of the important role they play in the town's landscape. To the average observer, the attention given to wetlands preservation by the Massachusetts Department of Environmental Protection and local Conservation Commissions seems out of proportion to their seeming worth. The word swamp has almost derogatory connotations in common usage, perhaps due to wetlands being seen as "useless", rather than possessing intrinsic value of their own. In truth, the real situation is quite the contrary — when all the services that wetlands provide are considered (flood control, drainage, water filtration, nutrient absorption, fish and waterfowl nurseries, and groundwater recharge) they are revealed to have immense community value.

Wetlands in Dunstable

In Dunstable, wetlands perform several functional and aesthetic duties, depending on the characteristics of the watershed. In the Nashua River watershed they "hold back" flood waters along Unkety Brook from reaching the main stream. For the Salmon Brook watershed, wetland marshes along the stream act as areas to accept flood waters when they come and serve to reduce the velocity and severity of flooding. They also assist in recharging ground water. The wetlands along the brook form a unified visual and aesthetic unit with the main stream. Unlike the wetlands in the other two watersheds, the Eastern Till watershed has smaller wetlands which are perched on elevated "plateaus" of rocky till, where streams connect wetlands rather than meander through them. Wetlands here can be seen as a series of sponges, which retain some of the fast-running water of the brooks that connect them, then slowly release it.

Functions of Wetlands

Since this report recommends various wetlands protection strategies, it is advisable to review why wetlands deserve to be protected. Wetlands have several functional and aesthetic purposes which warrant giving a high priority to their preservation.

1. Wetlands serve as natural drainage ways

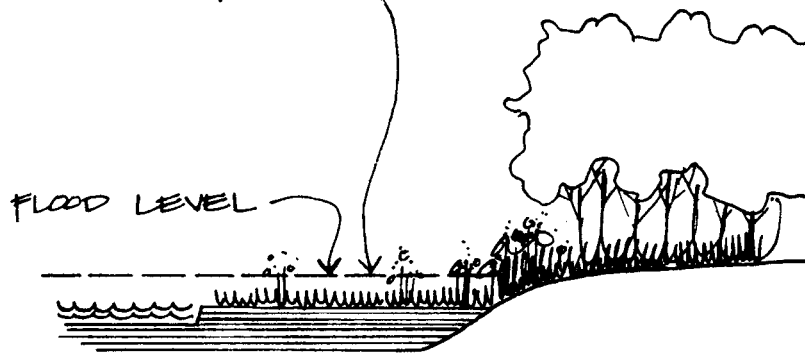
All water which falls on the landscape either is absorbed into the ground, evaporates, or proceeds on the surface to some low point. In Dunstable these low points are the brooks and wetlands which collect surface water from higher ground and transport it to either the Nashua or Merrimack Rivers. Wetlands and brooks thus perform an engineering function in serving as the town's stormwater drainage system.

In this capacity they (1) collect excess surface water, (2) serve as holding basins under flood conditions, and (3) carry away excess ground water. In this respect they perform these functions better than a manmade stormwater drainage system, since man-made systems seldom perform all three functions as well in terms of cost-effectiveness and low maintenance.

It is often impossible to determine the value to a community of natural resource preservation. If wetlands are destroyed, however, an alternative storm water drainage system must be constructed to replace this function of wetlands. How much would this "replacement cost" be?

The 1976 Plan estimated that if all wetlands and brooks in Dunstable were filled (as has been done in many communities) and replaced with an average of 48 inch reinforced concrete pipe where major collectors were needed, 248,600 lineal feet or approximately 47 miles of pipe would be needed for the main trunk line alone. Including maintenance manholes, the

WETLANDS SERVE AS
SAFE FLOOD PLAINS WHICH
LOWER DAMAGE - CAUSING
FLOOD VELOCITIES BY
ALLOWING FLOOD WATERS
TO OVERTOP LOW
EMBANKMENTS.



WETLANDS AS NATURAL FLOOD PLAINS

cost for this system was estimated at \$13,175,800 in 1976. Today, after 20 years of inflation have increased costs by 283%, such a piping system would cost \$37,292,097 — a very steep price for a small town. This costly system would only be a partial replacement for the natural wetland drainage, because without their associated wetlands to absorb the flow, brooks such as Salmon and Unkety could never be handled by 48 inch pipes at flood stage.

These replacement costs do not include the purchase of easements, maintenance of the drainage pipe and manholes, flood damage, or other costs involved with maintaining such a system. Most important, it does not take into account the loss to the community of other functional and aesthetic values of wetlands which are more difficult to quantify.

2. Wetlands help minimize flood damage

Wetlands do this in two ways: (1) they absorb and hold water during periods of peak runoff, and (2) they serve as safe flood plains for those areas that do flood. Wetlands thus serve a crucial role in watershed management, for they are perhaps the most important natural resource within watersheds in reducing the frequency and effects of flooding.

The water-holding capacity of wetlands is considerable. One acre of wetland will hold 300,000 gallons of water in a one foot rise. In acting as enormous sponges, they also slow down the velocity of flood water and the resulting damage, as the erosive capacity of water increases as the fifth of its velocity.

As development increases within a watershed, the value and importance of wetlands increases. This is because development brings with it higher rates of peak storm water runoff from paved surfaces, which increase flooding severity. Those development patterns that fill wetlands are doubly hazardous, for they not only increase the volume of peak runoff, but at the same time destroy nature's means of coping with it.

3. Wetlands are ground water recharge areas

In this role wetlands filter surface water into aquifer areas, providing a stable ground water table for town and domestic wells. During periods of excess groundwater and high water table, wetlands absorb and discharge water downstream.

Where wetlands overlay alluvial deposits, as in the Salmon Brook and Nashua River watersheds, their role in recharging the ground water table is especially critical. As the U.S. Geologic Survey has shown on the Ipswich River Basin, wetlands tend to stabilize the groundwater table by removing water during excess periods and recharging ground water at other times.

4. Wetlands serve as siltation settlement basins

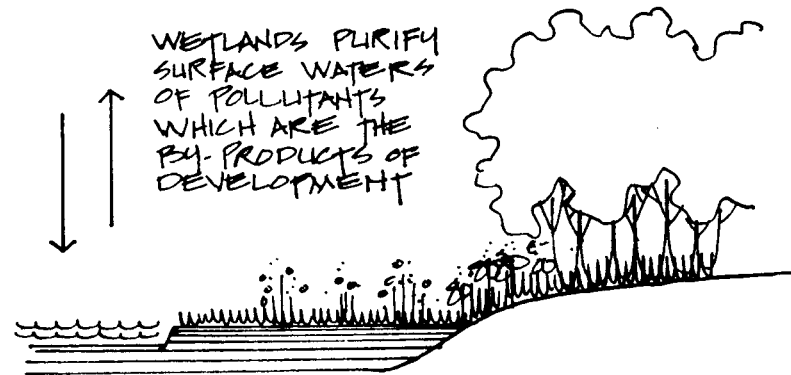
As soil and nutrients are washed from upland areas downstream, they are trapped in wetland areas and absorbed by them. In this way these organic materials are prevented from being washed into streams and ponds, which contribute to growth of algae and lake-bottom weeds and hasten the death of these water bodies through eutrophication. Wetlands in this role act as a filtering bed for those organic sediments and nutrients which would be harmful to other water resources. In wetlands however, they serve to build alluvial soil deposits on which wetland vegetation thrive. In areas which are extensively developed wetlands also trap sediments from roads and other paved surfaces and prevent these sediments from clogging natural or manmade drainage ways.

5. Wetlands purify the air and water of pollutants

One of the outstanding virtues of wetlands is their ability to cleanse the air and water of pollutants. As the concern over pollution increases, so does the realization that pollution abatement cannot be solely a technological solution but must rely to a great extent on processes of cleansing which occur naturally in the environment. Wetland ecosystems are one of the most important of these natural "self-cleansing" environments.

For example, studies have shown that in the Tinicum Marshes adjoining Philadelphia, 512 acres of brackish and fresh-water marsh at the confluence of the Delaware and Schuylkill Rivers, sewage effluent from nearby sewage treatment facilities is substantially modified by the cleansing action of these marshes. The study indicated that within three to five hours after the effluent water had moved across the marsh, there was a 57% reduction in biological oxygen demand (BOD), 63% reduction in nitrates, and 57% reduction in phosphates. This

WETLANDS PURIFY THE AIR
OF EXCESS NITROGEN OXIDES
AND PRODUCE AN EXCESS OF
OXYGEN AS PART OF PHOTOSYNTHESIS



WETLANDS AS POLLUTANT MODIFIERS

meant a reduction of 7.7 tons of BOD, 4.3 tons of ammonia nitrogen, 138 lbs. of nitrate, and 4.9 tons of phosphate.

Modern technology has drastically altered the natural nitrogen cycle. It is estimated that the natural turnover of nitrogen compounds in the United States is about seven to eight million tons. Our agricultural fertilizers add another seven million tons to the nitrogen cycle, building up in the groundwater in areas of intensive agriculture to the detriment of health.

Another two to three million tons of nitrogenous compounds is produced as by-products from power plants and automobiles, which emit these compounds into the air where they become components of acid rain. This more than doubling of the nitrogen input into the biosphere has caused serious environmental problems in areas throughout the country.

Wetlands include vast numbers of denitrifying bacteria that take these excess nitrogen oxides and convert them into the atmospheric nitrogen of which most of the atmosphere is composed. Through the process of photosynthesis, plants produce

an excess of oxygen than what they require for respiration. This excess oxygen is therefore added to the atmosphere. In wetlands mud the reduction of nitrogen and sulfur compounds containing oxygen also involves the production of oxygen. Not only do plants produce oxygen but lowly mud does also!

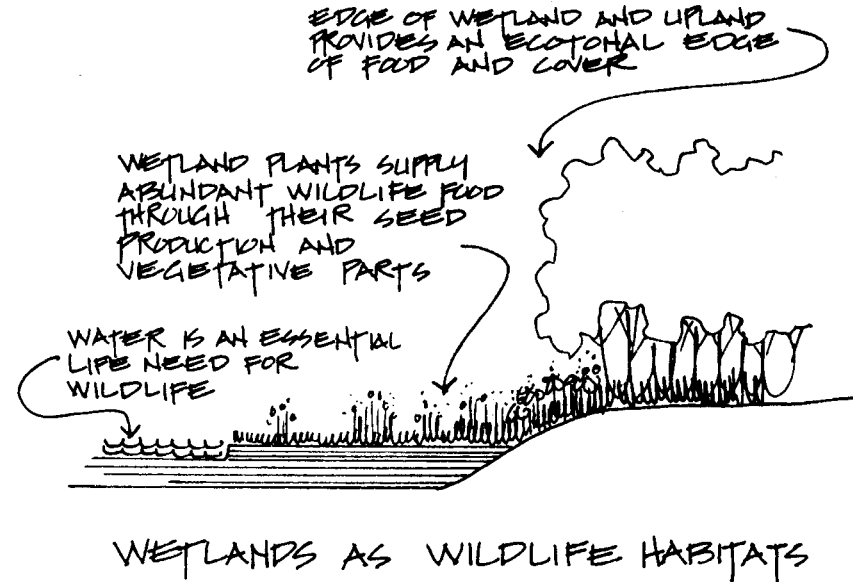
6. Wetlands are important wildlife habitats

As is demonstrated in the chapter on wildlife, wetlands are perhaps the most important natural resource supporting wildlife diversity. Wildlife need food, water and cover for a successful habitat, and wetlands provide all three in abundance. Because there exists a great variety of wetlands, this diversity also contributes to the variety of wildlife which can be supported.

7. Wetlands serve as a natural open space network, providing visual diversity and character to the town's landscape.

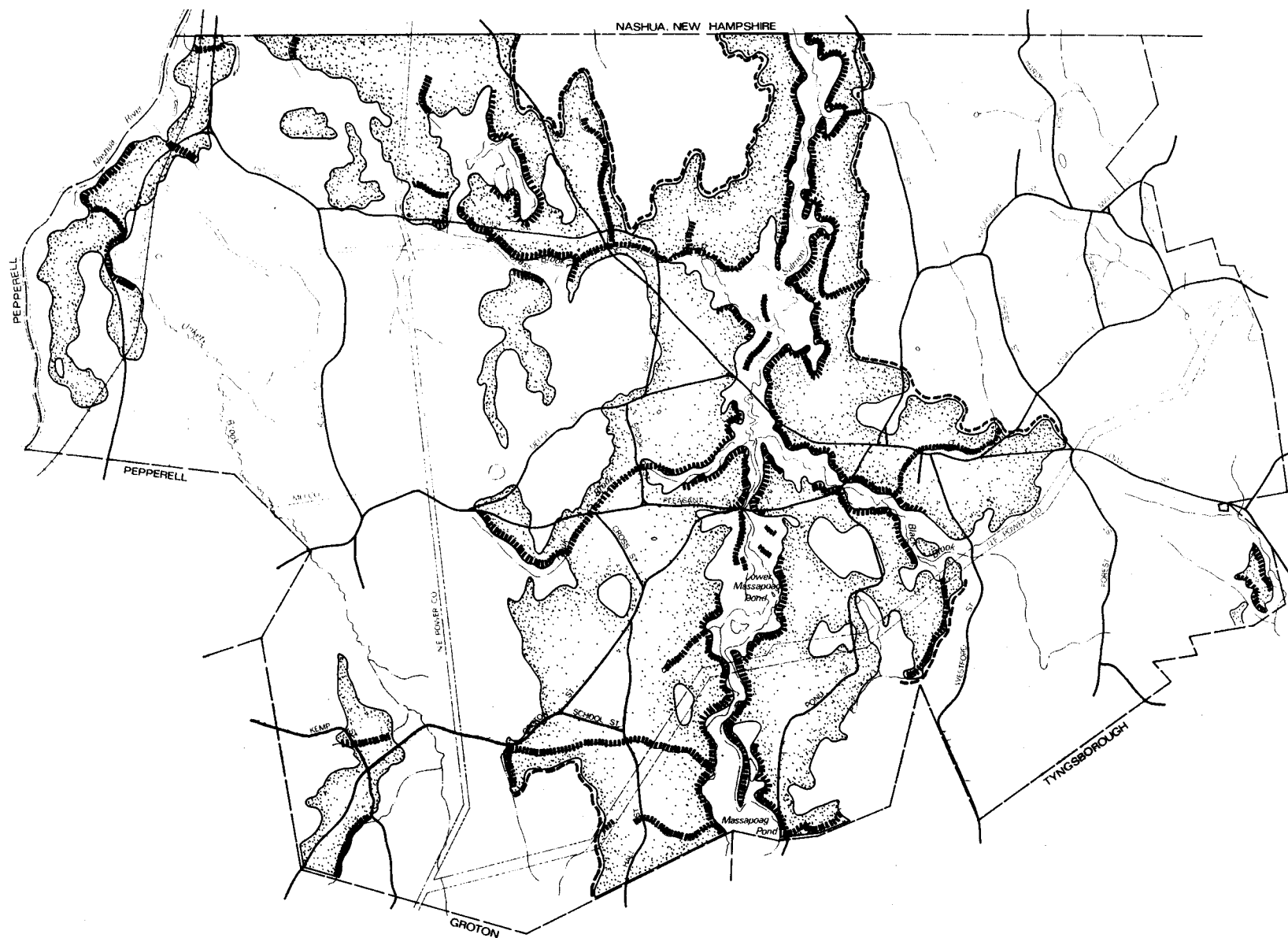
Because wetlands and streams are generally linked together as a drainage network, they can also be integrated with public open spaces to serve as a natural resource/open space network for the benefit of future generations.

Open marshes are a strong element of visual diversity, appearing as placid horizontal landscapes framed by dark wooded hills on either side. Between these two landforms there is contrast in line, color, texture, and form. Wetlands here call forth an appreciation of the woodland as well, for visual enjoyment of the marsh also requires preservation of its adjoining environment.






Groundwater Resources and Aquifer Recharge Areas

An effective resource conservation and open space policy in Dunstable should emphasize protecting those areas in town which have the most important natural resource values and which are most vulnerable to destruction through development. One of these resources which has special regional as well as local significance is groundwater aquifer areas. Because Dunstable has such excellent potential high-yielding aquifer resources, with many surface recharging streams, protection of these areas should be an important element in developing acquisition priorities. Although most of the town relies on on-site wells, the potential regional significance of these aquifers should enhance the probability of obtaining state and federal open space funding for their protection.



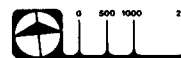
SOURCE: "SURFICIAL GEOLOGIC MAP OF THE PEPPERELL QUADRANGLE" BY THE U.S. GEOLOGIC SURVEY AND UNPUBLISHED SURFICIAL DATA OF THE NASHUA, SOUTH, U.S.G.S. QUADRANGLE.

LEGEND

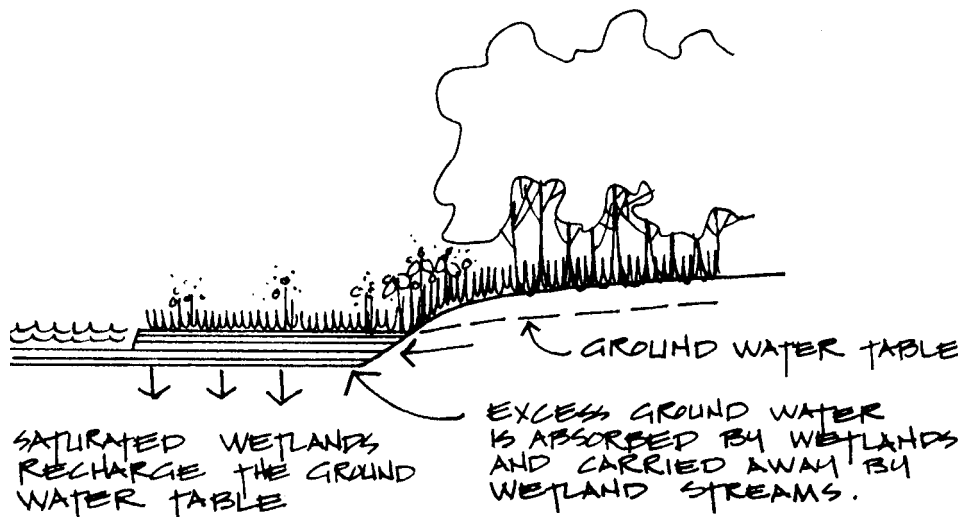
-  MAJOR GROUND WATER PRODUCING AQUIFER AREAS
-  MAJOR GROUND WATER RECHARGE INTERFACES
-  GROUND MORAIN-STREAM DEPOSIT INTERFACES

GROUND WATER AQUIFERS

Prepared for the Dunstable Conservation Commission
Dunstable, Massachusetts



environmental collaborative
ENVIRONMENTAL PLANNING
LANDSCAPE ARCHITECTURE
COMMUNITY PLANNING
SOCIAL RESEARCH



Wetlands as Groundwater Recharge and Discharge Areas

Characteristics of High-Yielding Aquifers

All soils contain water: some water exists in suspension between soil particles and some exists as saturated groundwater. Fractures in bedrock are also productive of groundwater. The most productive soils for groundwater aquifers are the highly permeable outwash glacial stream deposits of sand and gravel. This is because in the process of deposition, fine particles of silt and clay were washed downstream, leaving the larger particles and thus larger interstices between particles through which water can travel.

Aquifers with high-yielding water capacities have the following characteristics:

1. A water table within 10 feet of the soil surface, and not in excess of 30 feet, because of the loss of pumping head below that depth.

2. Permeable, saturated material, preferably at least 30 feet thick.

3. High transmissibility (lateral flow) of water through the soil material.

4. A dependable source of surface recharge of ground water.

Eastern Massachusetts contains extensive outwash areas, but only a small percent of these have all of the above characteristics. Since these areas also are most vulnerable to development due to their permeability for septic tank leaching fields, they are becoming urbanized faster than other soil types.

Contamination of municipal wells from road salt in more heavily built-up areas is further reducing the available aquifer resources. Therefore, any sizable groundwater aquifers remaining, as in Dunstable, should receive high priority for protection.

Ground Water Resources in Dunstable

Salmon Brook Aquifer: The most extensive groundwater areas existing in town are the glacial stream deposits along the Salmon Brook watershed. These kame and esker formations border both sides of the Massapoag Ponds and the brook and its marshes. At Joint Grass Brook these deposits branch out, with an extension northwesterly following the path of another glacial stream. This traverses the former gravel site off Fletcher Street, now the Dunstable Rural Land Trust's Tully Wildlife Refuge. Not only are these deposits extensive; but they are recharged by several major streams, the most important being Salmon Brook and the Massapoag Ponds. The other, smaller brooks are as important because they flow over these deposits and in so doing constantly recharge the ground water table. The Salmon Brook aquifer is the source of Dunstable's present small public water supply.

The deposits bordering the Nashua River are probably less productive because of the silty alluvium bordering the river

which may limit its recharging ability. Unkety Brook, however, flows over permeable material which could be a highly productive aquifer. The aquifer associated with Unkety Brook is likely to be the next most significant groundwater resource in Dunstable, after Salmon Brook's aquifer.

Groundwater and Resource Conservation

The plan of proposed open space acquisitions emphasizes protection of the Salmon Brook watershed, as have Conservation Commission easements and acquisitions in this area over the years. Protection of the Massapoag Ponds and the brook logically includes protection of the immediate upland area, which is all glacial stream deposits.

Strengthened development controls should include provisions for preserving streams and their embankments in outwash deposit areas as a means of protecting their effectiveness as recharge sources, and provisions to prevent pollution of groundwater from road salt and sewage effluent. Since these aquifer areas are often prime gravel extraction sites, new or extended gravel operations in town should be closely reviewed and supervised as to their effect on aquifer potential.

Because of the outstanding groundwater resources that have been mapped in Dunstable, the town would do well to adopt an aquifer protection bylaw, to prohibit potentially harmful uses from being sited in its aquifers.



Vegetation

Interrelationship of Vegetative Cover and the Physical Environment

All natural living systems tend to evolve towards an equilibrium with the larger environment. Human intrusion, however, constantly upsets this evolution towards stability. Sound environmental planning attempts to guide development in a community so that this conflict is minimized where the natural landscape is not overwhelmed but allowed to absorb the disturbance caused by land use changes.

This process is best understood by understanding that all living environmental systems exist in groups of interrelated "communities". This is due to the fact that each plant and animal species has a range of variation in environmental factors under which it will survive. This is called its 'environmental gradient' (the range of tolerance of a plant to soil moisture is an example of such a gradient). The various combinations of soil, water, and topography form a variety of environments to which different plant and animal species are adapted. The distribution of these integrated vegetative and wildlife communities in Dunstable is governed by these physical conditions.

The influence of geological factors on the living skin is not only one-way, however. The vegetation cover of the landscape also has its effect on the earth through the modification of erosion from precipitation, temperature modification, soil buildup from decaying matter, and greater relative humidity. The existence of vegetative cover has the important effect of moderating environmental extremes, particularly in temperature ranges and in the flow characteristics of water.

In addition, the visual characteristics of the landscape are to a great extent governed by vegetative type. The feeling of openness or enclosure, color, texture, and seasonality is determined largely by vegetative types.

A distinguishing characteristic differentiating plant and animal communities from other landscape features is their vulnerability to disturbance. Not being as stable as the non-living physical environment, the biological community needs careful consideration in town planning to avoid damage which may be irreparable or slow to recover from man-made disturbance.

There is a considerable variety of plant communities in Dunstable. For purposes of this study, these communities are subdivided into three major categories: forest cover, open field, and wetland.

Forest Land

Forests are by far the largest land use in Dunstable, covering 7,460 acres in 1985, or 70% of the Town's total land area. Dunstable lies within the Central Hardwoods - White Pine - Hemlock forest vegetation zone, as mapped by the Department of Environmental Management. Stands which are predominantly hardwood account for approximately 2,000 acres and predominantly coniferous stands cover about the same area. More evenly mixed hardwood/softwood woodland covers about 3,400 acres of the town. Softwood stands are primarily white pine, with hemlocks found on north-facing slopes. Hardwoods chiefly consist of various species of oak, maple, ash, hickory, locust and birch.

Most of Dunstable's forests are second succession growth. "Succession" is the term used to describe the evolution of plant communities over time until a community mix develops which is most adapted to the soil, hydrologic, topographic and climatic conditions of the site. As the process of community succession proceeds, the dominant species may alter the environment in such a way that makes possible the development of other species. The second species may alter the environment in such a way as to eliminate the first and allow a third species

to develop and become dominant.

This process continues until a species develops which does not alter the environment in such a way as to make itself less competitive, and which represents the most stable plant community for those climatic and site conditions. This stable plant community is known as the “climax” stage of succession. It will tend to maintain itself until man or nature changes the environment in some way. When that happens, the process of succession will begin once more.

As was true for most of southern New England, Dunstable was probably cleared of its virgin forests by the early 19th century, and converted to farmland by the town’s early settlers. A lithograph in the 1877 history of Dunstable shows a view from Chaney Hill towards the center of town. In it the landscape is entirely farm fields almost devoid of trees, except in the hills.

Towards the turn of the century, as farm fields became abandoned, sun-loving white pines developed into the climax forest community over much of the town. The MacConnell land use surveys of 1951 and 1971 show most of the town’s forests as ranging from 20 to 40 feet in height in the earlier survey and predominantly 40-60 feet high in 1971. This height uniformity is explained by townspeople as due probably to the disastrous consequences of the 1938 hurricane on the region’s forests, especially on its white pine stands. Dunstable’s woodlands have now recovered from that violent storm, which literally blew down the white pine forest.

The second succession forest is more heavily dominated by hardwoods than was true of the first stage. Shade-tolerant sapling growth of oaks and maples in the old forest emerged as the dominant species, and crowded out the less shade-tolerant pines. In the 20 year span between 1951 and 1971, MacConnell’s acreage statistics showed that predominantly hardwood stands remained stable at 2,200 acres, while stands

where conifers dominated grew from approximately 1,000 acres to 2,200 acres. This acreage growth occurred mainly at the expense of acreage in mixed hardwood/softwood forests. This is probably due to the fact that in till soils, hardwoods tend to dominate, but in sandier sedimentary soils, white pine often retains its ascendancy in second succession woodland.

In their 1991 publication “Forest Productivity Mapping of Massachusetts”, MacConnell et al. found that 87% of Dunstable’s forest lands are considered prime, having the capability to grow white pine and red oak at high rates.

Being the least developed part of Dunstable, the eastern portion of the town would have the greatest extent of uninterrupted blocks of forest. This is borne out by the GIS Protected Lands map showing Chapter 61, 61A, and 61B lands are more clustered in the eastern part of the town. One sizable block of forest stretching between two towns is an area of 356 contiguous acres in the south along Westford Street near Massapoag Pond, where the town’s Farnsworth Wildlife Refuge (96 acres) and the Staples Conservation Restrictions (15 acres) and 112 acres of land in Chapter 61 about the Division of Fisheries and Wildlife’s Fitch Wildlife Management Area (133 acres), most of which lies in Tyngsborough.

Throughout the town sufficient blocks of woodland exist to sustain hunting. At a community meeting, it was emphasized that there should be more awareness of hunting as an open space use, so that other users can take precautions in hunting season.

Open Field

Open agricultural land, both active and inactive, accounted for 1,930 acres of Dunstable’s total acreage in 1985, or 18 percent of the town’s total land area, essentially unchanged since 1971. Surprisingly, though, the amount of actively tilled cropland increased somewhat during this time.

Pasture land and abandoned fields, or open land, were reduced over this time. Pasture land in town has traditionally been on rocky till soils. Because of this the process of succession is probably one of pasture/abandoned field/pine forest/hardwood forest.

There were only 75 acres of active orchards in 1985, down 10 acres from 1971. Dunstable has 133 acres in power lines, or that area of the right-of-way which is kept clear of woody vegetation.

Wetland Vegetation

The total acreage in wetlands in Dunstable is far greater than shown in the MacConnell study, easily five or six times the figure used. This is because MacConnell classifies the wetlands which have over a 30 percent tree crown cover as forest, and by far the greatest amount of wetland in Dunstable is wooded swamp.

Wetlands are a stage in landscape succession from glacial lakes to dry land. Ponds and lakes are one of the most temporary of geologic phenomena. Left to itself, nature begins the process of converting ponds to dry land as soon as they are formed. Streams deposit silt and nutrients in the ponds. The succession of aquatic plants on the pond bottom and shoreline soon evolves into ever more woody vegetation. Eventually the seasonal cycles of growth and decomposition over thousands of years transforms the pond into a wetland, then into dry land.

Dunstable has the full range of inland wetland categories. These include the following eight types and vegetative characteristics.

1. Pond: Ponds in Dunstable are standing bodies of water, often with sources of inflow and discharge from streams,

springs, or watershed runoff. The characteristics vary, with some ponds with standing water year round on the larger streams, and some of a more seasonal nature which form during periods of high water table and runoff. These surface waters tend to be mildly eutrophic, that is, in the process of being filled by decaying plant matter and siltation. Two major plant forms are found in pond environments: submergents and surface vegetation. Submergents are plant life growing on the pond bottom (e.g. pondweeds, fanwort, waterweed, bladderwort). Surface vegetation are those plants with leaves principally on the water surface (e.g. white water lily, water smartweed, duckweed and liverwort). Swallow's and Shaw's Ponds are in this wetland category.

2. Deep Marsh: These wetlands have an average water depth between 6 inches and 3 feet during the growing season. Emergent marsh vegetation, (e.g. rushes, sedges, three-square, pickerelweed, bur-reed, arrow arum) is dominant with surface and submergent plants present in open water areas. Lower Massapoag Pond and the Salmon Brook Marshes are in this category.

3. Shallow Marsh: With an average water depth of 6 inches during the growing season, shallow marsh are dominated by robust or marsh emergents (e.g., cattail, reed, purple loosestrife, wild rice). Surface water may be absent during the late summer and abnormally dry periods. The lower reaches of Joint Grass Brook would tend to be classified as shallow marsh.

4. Seasonally Flooded Flats: These are extensive river floodplains where flooding to a depth of 12 inches occurs seasonally, with the soil remaining saturated throughout the year. Emergent vegetation is usually dominant, but shrubs and scattered trees may be present. The flood plains of Salmon and Unkety Brooks are of this wetland type.

5. Meadow: This wetland may have up to 6 inches of surface

water during late fall, winter and early spring, with the soil saturated but exposed during the dryer seasons. Meadows have often been ditched for agricultural grazing and crops. Left undisturbed, these wetlands support vegetation of tall and short meadow emergents (e.g., woodgrass, wild millet, reed canary grass, spike rush, and sedge). The McGovern Farm Land near Main Street is meadow of this type.

6. Shrub Swamps: Shrub growth dominates this wetland, with marsh and meadow emergents occupying open areas. In shrub swamps, the soil surface is flooded with up to 12 inches of water seasonally or permanently. Sections of Hawk Brook are in this wetland category. Vegetation in shrub swamps includes buttonbush, willow hardhack, sweetgale, leatherleaf, viburnum, highbush blueberry, alder and hornbeam.

7. Wooded Swamp: This is the latter stages of wetland evolution from pond to terrestrial ecology. The largest wetland acreage in Dunstable is in this category. Red and silver maple, American elm, swamp white oak, pine oak, white pine and hemlock are the most common tree species.

8. Bogs: Bogs have their origin as ponds, and often still have a portion of standing water at the center. The distinguishing characteristic of bogs is that they consist of a floating mat of sphagnum moss, sedge and other plants that have slowly grown outward from the shore, eventually covering the whole pond. Bogs are often known as “quaking bogs” because this flexible mat will shudder and quake when walked upon. Hawk Swamp in Dunstable is such a bog. It is still in the process of covering its glacial pond.

The plant communities of bogs are distinguished by their ability to survive in a low-nutrient environment. Bogs are impoverished of nutrients due to the lack of decomposition and the acidity of the mat environment. Vegetation includes sphagnum, azalea, black spruce, cranberry, high-bush blueberry, laurel, larch, leatherleaf, orchids, pitcher plants, and white cedar.

Rare, Threatened, and Endangered Species:

Investigations are ongoing to document the possible occurrence of a rare plant in Dunstable. No other rare plant species or plant communities are known in Dunstable at this time.

Goals for Protecting Vegetative Cover

The many important functions that plant cover performs can be summed up in one critical phrase: they moderate environmental extremes. When humans destroy this vegetative cover for their own purposes, they are removing this moderating influence and inviting extremes in environmental behavior. Increased runoff of storm water and consequent flooding is one result of decreasing vegetation cover within a watershed. Another result is decreased water quality due to loss of the filtration and nutrient uptake provided by vegetative buffers around water bodies.

Human activities in the environment are naturally disruptive, and there is little possibility of avoiding this disruption. What conservation planning can help accomplish, however, is to provide guidelines for future development in Dunstable, so that the most important stabilizing environmental elements are left intact. In this way, nature will be left free to modify environmental extremes induced by development and absorb their impact. Various planning controls can be implemented to assist in environmental stabilization. These include:

1. Reservation of landscape environments which should not be disturbed, to be left in their natural state. This can be accomplished through such ordinances as zoning, or, if this provides insufficient protection, through outright acquisition. Such areas would include natural drainage ways, such as wetlands and flood plains, and their continuous embankments.

2. Controls to provide protection against environmental extremes due to development, for example: subdivision controls requiring retention of excess runoff, open space buffers

and prohibitions against building in hazardous areas or areas where health hazards might result from septic tank effluent disposal in unsuitable soils.

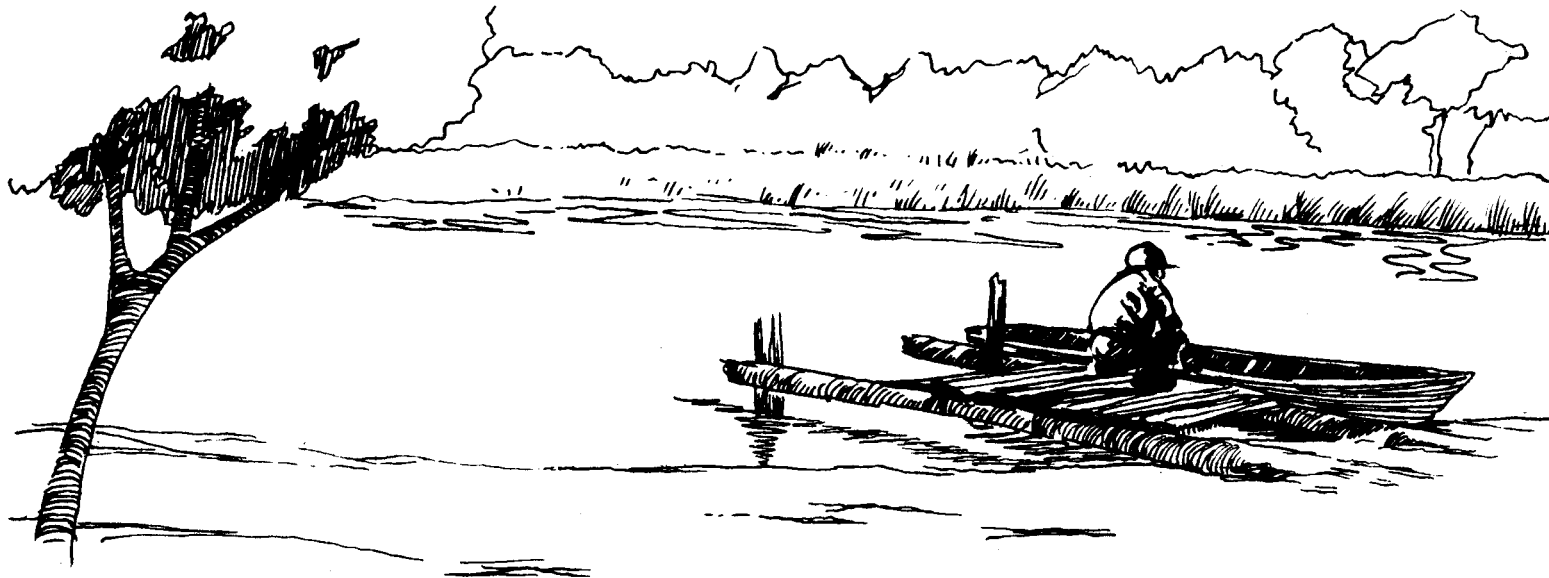
3. Encouragement of sufficient environmental and plant variety to allow regeneration in disturbed areas.

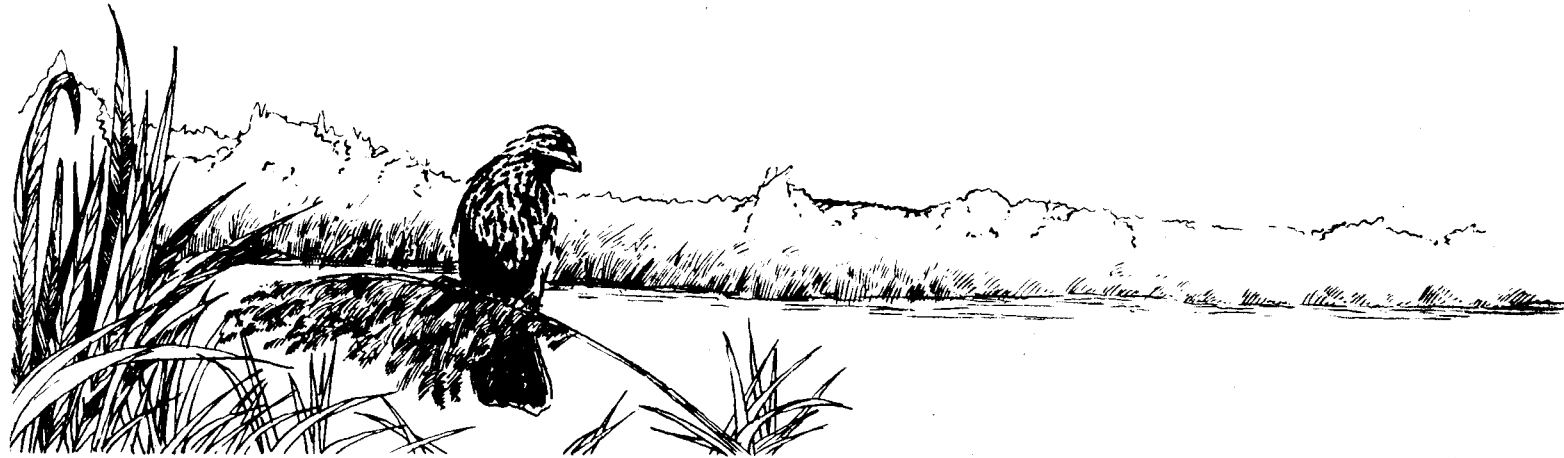
Management practices in logging and in controlling vegetation in power line rights-of-way can assist in the regeneration of vegetative growth which provides improved wildlife habitats, recreational potential, and visual quality. This can be implemented through cooperation among private interests and the Dunstable Conservation Commission.

4. Preservation of vegetative buffers. This is especially important in preserving visual continuity along Dunstable's roadways and water bodies. Through zoning and scenic road ordinances, a vegetative buffer can be encouraged to be left

along roads. Through adoption of a Massachusetts Rivers Protection Act, vegetative buffers can be protected along the major streams. Also, towns have authority to establish their own river, pond, and stream protection bylaws, which can serve to protect vegetative buffers more thoroughly than is now possible under the Wetlands Protection Act. Cluster development regulations should also incorporate provisions which will assure the preservation of any unique plant communities as open space within the tract. Public encouragement of certain farming practices which encourage wildlife habitats is another approach to buffer preservation.

5. Preservation of those plant communities which are productive wildlife habitats. This objective can be implemented through various approaches, from educational to acquisition. Specific areas which deserve protection are outlined in the next section on wildlife.





Fisheries and Wildlife

Wildlife Distribution

Wildlife are to be found wherever a specific plant community provides a hospitable habitat. To fulfill the needs of the life cycle, a wildlife habitat must contain three essential elements: food, cover and water. Wherever these three elements are found together in the landscape, a concentration of various wildlife populations will be found also.

For these three elements to be present, a landscape must have a sufficient variety of vegetative communities. This variety is most often found where two different plant communities meet, e.g., at the edge of field and forest, or pond shoreline and marsh. This edge is known as the landscape “ecotone.”

The tendency for the ecotone to have a greater variety and diversity of wildlife is known as the “edge effect.” The overlapping of the two plant communities provides greater envi-

ronmental variety. Often, many species of wildlife require two differing habitats as part of their life history. Partridge, for example, require three plant communities to complete their seasonal life cycle needs: (1) shrubs and low cover for rearing broods and for summer and fall foods, (2) hardwoods for nesting and for fall winter and spring foods, and (3) evergreens or brush for winter cover. Even animals normally considered aquatic for much of their life cycle, such as the Blandings turtle, require uplands for breeding, since dry sandy soils are the preferred nesting sites.

For most species, those habitats which are desirable for providing cover (for hiding, sleeping, rest and breeding) are not the same communities which are most productive of food. This is especially true of bird populations, since most species require trees for nests and cover but feed largely on low-lying vegetation. Studies have found that up to 40 percent of com-

mon bird species in some locations were found to be either partially or entirely ecotonal.

Inventory of Wildlife Habitats in Dunstable

1. Forest-Streambed Habitat: This environment supports white-tailed deer, fox, grey squirrel, red squirrel, snowshoe hare, cottontail rabbit, raccoon, mink, beaver, otter, small rodents and carnivores. According to local residents, even wildcat have been sighted on Horse Hill. Vegetative food sources here are hardwood sprout growth, nuts, seeds, bark, and shrub vegetation.

2. Woodland-Field Habitat: Abandoned fields which are sprouting sapling growth and the edges of fields where they abut woodland are especially productive areas of wildlife, especially gamebirds and songbirds. Species to be found here include partridge, quail, pheasants, woodcock, and many of the mammals of the forest-streambed habitat. The primary foods for these species are various weed seeds, agricultural crops, especially corn, various vegetable parts of woody plants, and insects and worms.

3. Woodland-Wetland: This is the primary habitat for many waterfowl and most songbirds. Kingfishers, killdeer, great blue heron, buteo hawks, owls, as well as innumerable songbirds, are found here. Since wetlands and open water bodies are important to all species for water and for the vegetation they produce, this environment has a wider range of animals who use it than just those listed. Songbirds subsist on a great variety of weed seeds and seeds and fruit of woody plants, as well as insects and worms. The other birds listed are birds of prey and subsist principally on small mammals or aquatic life and fish.

4. Marsh-Open Water Habitat: These wetlands are shrub or deciduous marsh along streambanks or on pond shorelines.

This is the main habitat of waterbirds including the common mallard, black duck, Canada goose, and American bittern. Their diet consists mainly of aquatic wetland vegetation.

5. Stream Habitat: Fish and aquatic mammals are the primary wildlife found in the streams of Dunstable. Rainbow, brown and brook trout, large-mouth bass, and pickerel are the large game fish found in the town's streams. The Division of Fisheries and Game stocks Unkety and Salmon Brooks.

6. Vernal Pools: These ephemeral, often small, springtime wetlands play a crucial role in the life cycle of many amphibians, serving as fish-free breeding waters where several species of frogs and salamanders can lay their eggs without the danger of having them devoured by fish. Some creatures such as the wood frog, fairy shrimp, and several salamanders are entirely dependent on vernal pools for successful breeding. With amphibians in decline world-wide, it is critical to identify vernal pools so they can be protected under the Wetlands Protection Act. Rare reptile species such as the blue-spotted salamander are known to occur in vernal pools.

Corridors for Wildlife Migration

Dunstable's major wildlife corridor is the Nashua River, which is recognized as having international importance as a migratory flyway. It is named as a priority for protection under the North American Waterfowl Management Plan, an agreement between Canada, Mexico, and the United States. During the spring and fall bird migrations, the Nashua River is the second most commonly followed flyway in Massachusetts, after the coast.

Within the town itself, Salmon Brook and Massapoag Ponds and their associated wetlands are likely to be significant wildlife corridors, serving as the central spine of open space to which most of Dunstable's network of wetlands connects.

Rare, Threatened, and Endangered Species

State-listed rare species are found in the stream and wetland habitats of Dunstable. There are five areas in the town where state-listed animals have been documented, including rare turtles and the bog lemming. Studies are ongoing to document vernal pools where the blue-spotted salamander has been observed to breed.

Goals and Objectives for Protecting Wildlife Habitats

Several approaches in public policy can be followed to preserve habitats and make existing vegetative cover more hospitable habitats. The goal here should be the creation or preservation of diversity in plant cover, especially ecotones. Specific actions include:

1. Preservation of wetlands and surface water resources, and their contiguous vegetative buffer around them.

Wetland swamps and marshes are perhaps the most important productive wildlife area. In addition to the wetland itself, sufficient upland vegetation should be included to preserve the two vegetative communities which make up that ecotone.

2. Encouragement of forestry practices which create ecotones. These practices include creation of openings in forest stands to encourage sprout growth, especially soft maple. This is especially critical for those animals, such as deer, whose winter diet is mostly browse consisting of tender sprout growth of trees and shrubs.

In addition to the above, forestry practices could encourage some mixed stands where one species is being forested. In hardwood stands, evergreens could be planted, and openings created in coniferous stands to allow hardwoods to emerge. Dunstable's woodland is generally mixed to some degree, but

encouragement of evergreen cover and hardwood food sources where they are needed would improve the forest habitats. In addition, old dead trees should be left for dens and nests, and additional planting of native nut or fruit-bearing trees would help to supplement food sources.

3. Hedgerows along agricultural field edges could be left to provide food and cover for small mammals, gamebirds, and songbirds. Birds can be effective agents for pest management, with all the insects they consume.

4. The town should encourage the owners of the power line rights-of-way to allow mixed shrub and sapling growth within these areas, even if only along the woodland edge.

5. Old abandoned orchards should be preserved. They are productive wildlife habitats, especially for bluebirds.

6. In developed areas, the edge between cleared areas and woodland should be allowed to grow into shrubs. This can be done through educational campaigns with individual owners and through design controls in subdivision regulations that address woodland preservation.

7. Land owned by the Conservation Commission and the town should be managed using the suggested forestry practices.



Scenic Resources and Unique Environments

Scenic Landscapes:

The general rural landscapes noted in the section on Landscape Character contain some specifically noteworthy areas. One part of Dunstable is mapped in the Massachusetts Landscape Inventory as a Distinctive Landscape — the corridor along the Nashua River from East Pepperell to the state line. This free-flowing reach of the Nashua River has also been named for potential designation under the Federal Wild and Scenic Rivers Act. Efforts should continue to permanently protect this outstanding area.

The rural roadside views along Route 113 from the town center to the Tyngsborough line were noted in community meetings as being an important scenic landscape to protect, known as the “Gateway to Dunstable”. The stone walls, venerable

trees, open fields, active farms, historic buildings, and rolling forested hills visible along this winding road form the essence of Dunstable’s rural character. This stretch of Route 113 and the countryside it traverses are an organic whole. This road lays within its landscape as it has for centuries, and offers an opportunity for mall-weary travelers to slow down and savor the real New England. It is of great concern in Dunstable that this roadside landscape should remain intact.

Particular hilltops named in community meetings as being worthy of protection are Blanchard, Drake, Forest, Horse, Nuttings, Spectacle Hills. These hills are valued both for the views from their tops and for the views of them from various points around the town.

Major Characteristic or Unusual Geologic Features:

Dunstable has some major characteristic glacial landforms: drumlins and outwash formations. Of particular note are the steep slopes of the kame terraces that rise above the wetlands bordering Salmon Brook. These features are shown on the Surficial Geology map.

Cultural and historic areas:

The 1976 Plan inventoried some 134 historic sites: mills, homesteads, schools, taverns, stores, cemeteries, quarries, the church, and an Indian Battle site on Hound Meadow Hill. Most of these sites have historic buildings still extant, and are on the Massachusetts Historic Register, but no research has yet been completed to enter any of them into the Federal Register. One historic building, the old Winslow Schoolhouse on Main Street near the Tyngsborough line, is home to the Dunstable-Tyngsborough Historical Society. As befits an agrarian community, most of the historic homesteads are scattered about the town, but in the town center, there is a cluster of historic sites. This is an area well worth protecting through a Historic District. Evidence of earlier inhabitants is here, too. Not far north of the town center lies an old Indian grinding stone.

Areas of Critical Environmental Concern:

Although there are now no designated Areas of Critical Environmental Concern (ACEC) in Dunstable, the town has such an outstanding array of resources that there are places worthy of ACEC designation. To qualify as an ACEC, an area must include at least four natural resources, and the ACEC designation must be strongly supported by local people. Once an area becomes an ACEC, any project that requires state approvals has to be reviewed through MEPA, the Mass. Environmental Policy Act. An ACEC does not apply to local controls, which continue as before. Having an ACEC can increase local control. By putting the state on notice that the

resources in this area deserve protection, an ACEC designation gives local citizens more chance for input into the state permitting process. This can strengthen the town's control of its destiny, by involving local review of state actions. An ACEC would chiefly affect large projects, often the ones that could benefit the most from more careful review.

One possible candidate for an ACEC is the Salmon Brook Valley, which has a tremendous array of resources with its water bodies, water supplies, aquifer, wetlands, floodplains, productive farm and forest lands, historic places, and special scenic and recreational areas. There are rare species along its Black Brook tributary. Taken as a whole, the Salmon Brook Valley appears well qualified to become an ACEC.

Achieving an ACEC requires much work to research all the area's resources and document them to prepare a nomination for the area. An ACEC for the Salmon Brook Valley would involve coordination among the towns of Groton and Tyngsborough as well as Dunstable itself.

Once an ACEC nomination is accepted by the Office of Environmental Affairs, the nominators must hold meetings to inform people about how an ACEC works and to get public input. The Department of Environmental Management has very knowledgeable staff who assist with informing the public once a nomination is accepted by the state. However, the groundwork and the gathering of support has to be done by local people before a nominated ACEC can be officially designated and go into effect. The recently designated Central Nashua Valley ACEC took three years to achieve.

If a group of people from the three Salmon Brook watershed towns is able to make the effort, an ACEC could help to protect the watershed from over-development, and reduce further eutrophication in Massapoag Pond. The process of nominating and designating an ACEC is an excellent way to raise public awareness of the communities' valuable natural resources.

Potential Environmental Problems

Information sources: Board of Health, Paul Staples (Mass. Waterwatch Partnership member), Hugh McLaughlin (Town of Groton Hydrogeologist)

Town Landfill

It is closed and does not appear to be a problem. It is monitored at several groundwater and surface water monitoring sites. These consistently show zero to background level values of contaminants. As a result, the Board of Health is seeking a waiver from the Mass. Department of Environmental Protection, asking to retain the intermediate level of cover that is now on the landfill, and not to add further levels of cover. Monitoring will continue regardless of the outcome of the waiver.

Hazardous Materials

Household hazardous waste is collected annually in collaboration with the town of Pepperell at a fire station in Pepperell.

Agricultural sprays and chemicals are not currently monitored by the Board of Health. The Board has received no reports of mis-use of these materials at the farms and orchards where they are likely to be in use.

Petroleum products: The gasoline storage tank at the General Store on Pleasant Street is within a liner and is monitored. No such control exists regarding any other buried petroleum storage tanks. They are a real but untracked threat to groundwater.

The Board of Health is also concerned about possible spillage of motor oil and solvents at local garages and throughout town due to many home-owner repair and oil change activities. There are only 2 auto repair facilities in town: West's Garage next to the fire station on Pleasant Street and Riopelle's on Pleasant Street across from the power sub-station. There is the Dumont Corporation garaging area on Lowell Street, and the garage behind the garden shop on Pleasant Street is immedi-

ately adjacent to Salmon Brook.

Point and Non-point Water Pollution

There are no NPDES dischargers in the town. Water pollution is currently minimal. Dunstable is essentially free of large sources of contaminants.

Septic Systems: Groundwater contamination by nutrients (nitrates and phosphorus) from septic systems should not become a problem as long as systems are well-made and maintained, because of the low density of housing resulting from 2-acre zoning.

Lawn chemicals: The potential for improper use exists. The only identifiable area of any size subject to these chemicals is the portion of Sky Meadow Golf Course that extends into Dunstable from Nashua. The drainage from here flows north into Nashua, NH.

Agricultural runoff: Problems have not been experienced off-site. Some contamination of the stream that flows through the McGovern farm barnyard may be assumed. This is a historic condition dating from the first use of the location. The farm maintains a lush grassy meadow downstream of the barn. This serves as a filter to trap sediments washed out of the barn yard. The Tully Farm on Fletcher and Hollis Streets has considerable areas with underdrains to improve cropping capacity of the fields in wet years. There may be some contamination of these drainage waters. But the owner has an extensive vegetated area beyond the limits of the fields through which all drainage must pass; there is again the potential to contain contaminants on site.

Potential water pollution from outside the town:

There is concern about the water quality of the two main streams that drain parts of other towns through Dunstable:

Salmon Brook and Unkety Brook. Both are over known or presumed aquifers which have potential for municipal supply. The threat to Unkety Brook would come from continued development in Pepperell and Groton.

Salmon Brook flows out of Lake Massapoag, which could be subject to eutrophication due to development in its watershed, most of which lies in Groton and Tyngsborough. For the past 6 years, the Massapoag Rod and Gun Club has sponsored water quality testing of the lake through the Massachusetts Waterwatch Partnership. Testing is done monthly from April through October. The lake is in no danger from acid rain: its pH is 6.8 and it has adequate alkalinity. At times in the summer, dissolved oxygen measurements indicate that the lake bottom water has insufficient oxygen. Massapoag is quite deep. The Club, which owns the dam that holds back the Pond, periodically draws down the water in winter to reduce weed growth. These efforts have met with some success. Phosphorus is measured once a year; it is unclear whether there are any trends of this nutrient. There may be some failing septic systems as seasonal camps have been converted to year-round use.

From 1975 to 1988, the town of Groton had a landfill in the upper part of the Massapoag watershed near Cow Pond Brook, the main tributary leading into Massapoag Pond. It was identified in the 1976 Plan as a potential source of pollution; so far, this has not been borne out. In 1988, this landfill closed, prematurely filled due to an excess of cover material and a higher than expected proportion of demolition debris. Both of these factors would tend to reduce the amount of leachate from this source; demolition debris tends to be more inert than household trash. Ongoing monitoring since the landfill was closed continues to show no significant contamination. Iron levels found are at typical background levels. Over the past 8 years, monitoring wells upgradient of the landfill show the same results as those downgradient; there is no trend of any

increase in contamination. This site will be completely closed in the coming years. The town of Groton is doing a comprehensive site assessment for landfill closure in accordance with Department of Environmental Protection requirements.

Section 5

Inventory of Lands of Conservation and Recreation Interest



SECTION 5 - INVENTORY of LANDS of CONSERVATION and RECREATION INTEREST

Update

At the time of Dunstable's 1976 Open Space and Recreation Plan, the town had only 341 acres of conservation land. As of January 1998 there are 1,595.6 acres of public and private land permanently protected for conservation, recreation, and agriculture —more than a four-fold increase! This success is due to the public-spirited citizens who formed the Dunstable Rural Land Trust, to the generous landowners who have given land to the town and the Trust, to dedicated members of the town's boards and commissions, and to state conservation agencies. More than one-third of the conserved acreage has been donated. Both the Conservation Commission and the Trust have added to Greenways along Salmon and Unkety Brooks. The major conservation acquisition planned in 1976, the 165-acre parcel on Fletcher Street, is now the Rural Land Trust's Tully Wildlife Refuge. Progress since 1976 shows in the Appendix Record of Accomplishments.

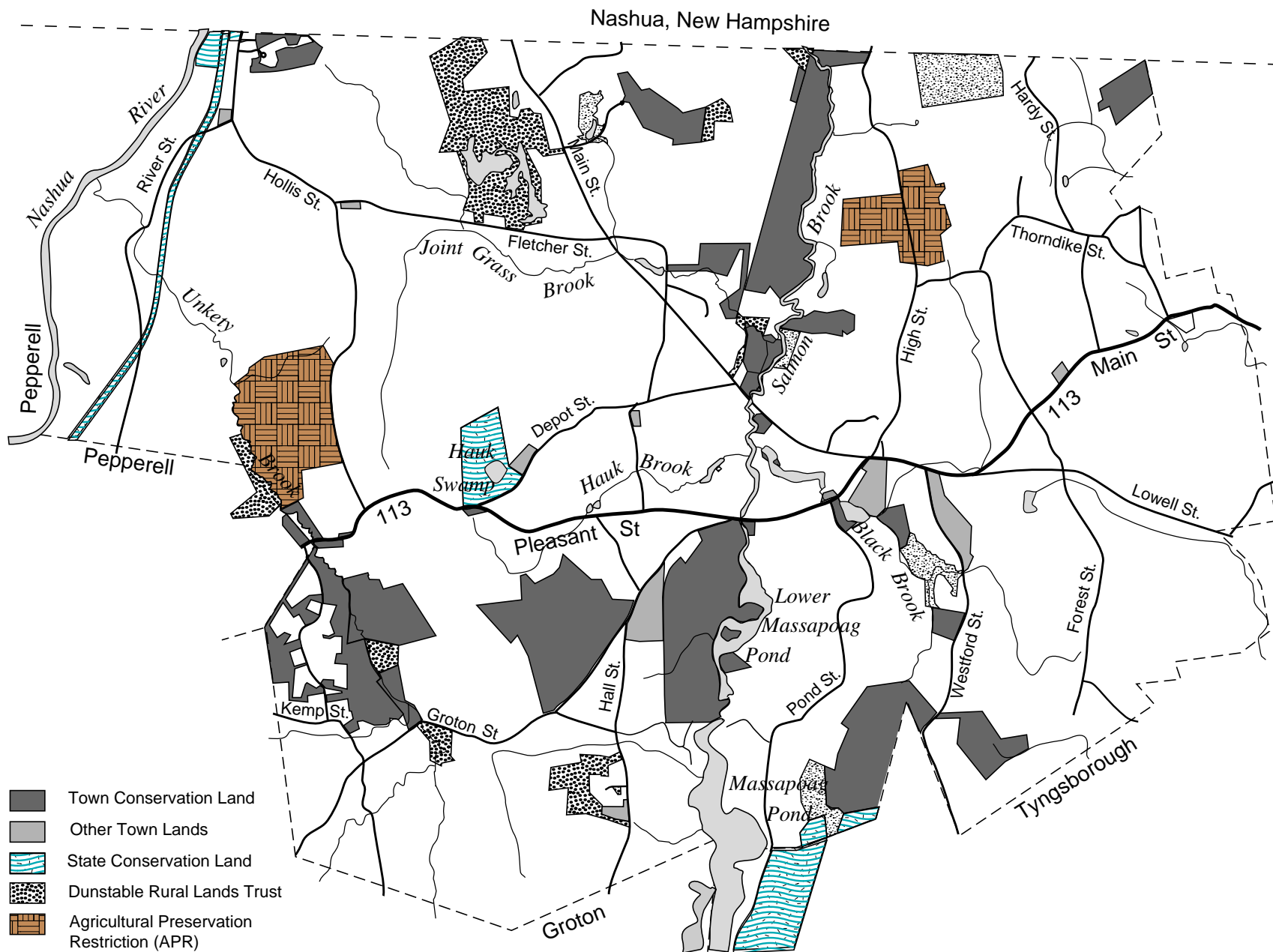
The 1976 Plan expressed concern about the impact of full market valuation on open space land. At that time, there was a recently adopted state law that property be assessed at 100% market value. This meant large tax hikes for open space landowners, which could lead to accelerating land subdivision. Recognizing this effect, the state legislature established special reduced valuation categories for lands in open space use.

A lower assessment on lands in open space use is fair because public service costs are far lower for land in this use. Studying three Massachusetts towns, the American Farmland Trust found that farm/open land generated more revenue than they required in services, while residential uses cost the towns more. For every dollar paid in taxes, farm/open land only

required 33 cents in services, while residential land required \$1.12 in services for every tax dollar paid. Because the town values its rural character, the Board of Assessors has encouraged owners of large parcels to classify them under the appropriate category of Chapter 61 (Forest Management), Chapter 61A (Agriculture), or Chapter 61B (Open Space Recreation or Wildlife Habitat). Dunstable has 1,715 acres classified in Chapter 61A. Another 973 acres are classified as managed forest in Chapter 61. Considering that Dunstable's largest land use is forest (7,460 acres), Chapter 61 land is a relatively small proportion of forested land. There are 134 acres in Chapter 61B. Although these special property tax classifications do not serve as permanent open space conservation measures, their prevalence indicates that many Dunstable landowners intend to continue farming and forestry.

Access for People with Disabilities (Universal Access)

A few of the town's conservation and recreation properties meet this need. The Shaw Conservation Area near the town center on Pleasant Street has adequate parking with a good view of the Mill Pond for birdwatching and wildlife observation. The Conservation Commission has a long-range goal of creating universal access down to the pond shore. The newly acquired Unkety Woods Preserve has universally accessible paths and adequate parking. Regarding active recreation areas, the present Town Field has a universally accessible pathway. The new Larter Field athletic facilities are planned to be wheelchair accessible. For more information see Appendix A: Americans with Disabilities Act / Section 504 Self-Evaluation.



Note: This map is for planning and educational purposes. Due to its small size, it cannot be used to precisely locate areas on the ground.

CONSERVATION LANDS
DUNSTABLE, Massachusetts
Open Space and Recreation Plan 1998
Prepared for the Conservation Commission

INVENTORY of LANDS of CONSERVATION and RECREATION INTEREST

PUBLIC and NON PROFIT LANDS

Site	Ownership	Management	Acres	Funds Used	Zoning	Public Access	Universal Access	Activities and Use	Degree of Protection
Allgrove Gift	Dunstable Rural Lands Trust	same	15	gift (Allgrove)	R-1	none (backland)	none	wildlife habitat	perpetuity
Flat Rock Hill	Dunstable Rural Lands Trust	same	8	gift (Chaney)	R-1	none (backland)	none	wildlife habitat	perpetuity
Horse Hill Quarry	Dunstable Rural Lands Trust	same	38.15	gift	R-1	at Hall St.	none	wildlife habitat	perpetuity
Lupien Parcel	Dunstable Rural Lands Trust	same	18	private	R-1	none (backland)	none	wildlife habitat	perpetuity
Mill Brook	Dunstable Rural Lands Trust	same	7.24	gift	R-1	Main St. through Sargent Cons. Area	none	fishing, nature study	perpetuity
Sweet's Pond Cons. Area	Dunstable Rural Lands Trust	same	0.156	gift	R-1	none	none	wildlife habitat	perpetuity
Tully Wildlife Refuge	Dunstable Rural Lands Trust	same	165	private	R-1	Fletcher and Main Streets	none	hiking, x-c skiing, fishing, horseback riding, nature study, scenic views	perpetuity
Tully Conservation Area	Dunstable Rural Lands Trust	same	3	gift (Tully)	R-1	through Arched Bridge Cons. Area, or by boat	none	fishing, nature study, wildlife habitat	perpetuity
Unquetynasset Brook Meadow	Dunstable Rural Lands Trust	same	14	gift (McGovern)	R-1	Pleasant St. (parking for 3 - 4 cars)	view	hiking, fishing, birdwatching	perpetuity
Arched Bridge Conservation Area	Town	Conservation Commission	12	gift (Biron)	R-1	at High Street, includes boat landing for Salmon Brook	none	hiking, cross- country skiing, fishing, boating, horseback riding, nature study	perpetuity

Site	Ownership	Management	Acres	Funds Used	Zoning	Public Access	Universal Access	Activities and Use	Degree of Protection
Bacon Conservation Area	Town	Conservation Commission	14	town	R-1	through Town Fields	none	hiking, cross-country skiing, fishing, nature study	perpetuity
Biron Conservation Area	Town	Conservation Commission	10	gift (Biron)	R-1	Westford St.	none	nature study, wildlife habitat	perpetuity
Blanchard Hill Open Space	Town	Conservation Commission	39.38	gift	R-1	Sky Top Lane	none	wildlife habitat, nature study	perpetuity
Blue Heron	Town	Conservation Commission	2	gift	R-1	Pleasant St.	none	fishing, nature study	perpetuity
Craven Conservation Area	Town	Conservation Commission	2	gift	R-1	Pleasant St.	none	fishing, nature study	perpetuity
Chapman Conservation Area	Town	Conservation Commission	1.7	town	R-1	Pleasant St.	none	nature study	perpetuity
English Wildlife Refuge	Town	Conservation Commission	34	gift (English)	R-1	Westford St.	none	hiking, nature study, wildlife habitat	perpetuity
Farnsworth Wildlife Refuge	Town	Conservation Commission	96.3	gift (Farnsworth)	R-1	Westford St.	none	hiking, nature study, wildlife habitat	perpetuity
Fox Run	Town	Conservation Commission	2.14	gift	R-1	back land on Black Brook	none	wildlife habitat	perpetuity
Gardner Conservation Area	Town	Conservation Commission	3	town	R-1	Pleasant St.	none	fishing, nature study	perpetuity
Goldthwaite Conservation Area	Town	Conservation Commission	1.3	town	R-1	by boat only	none	fishing, nature study	perpetuity
Hogg Conservation Area	Town	Conservation Commission	27	town & gifts	R-1	by boat only	none	fishing, nature study	perpetuity
Holmes Conservation Area	Town	Conservation Commission	5	town	R-1	by boat only	none	fishing, nature study	perpetuity

Site	Ownership	Management	Acres	Funds Used	Zoning	Public Access	Universal Access	Activities and Use	Degree of Protection
Jointgrass Brook Conservation Area	Town	Conservation Commission	21	gift (Craven)	R-1	Mill and Swallow Streets	none	hiking, nature study, wildlife habitat	perpetuity
Keyes Meadow Conservation Area	Town	Conservation Commission	18	town	R-1	Groton St.	none	fishing, nature study	perpetuity
Kennedy Conservation Area	Town	Conservation Commission	50	town	R-1	through Arched Bridge Cons. Area, or by boat	none	hiking, fishing, horseback riding, nature study	perpetuity
Proctor Conservation Area	Town	Conservation Commission	35	tax title	R-1	through Kennedy Cons. Area, or by boat	none	hiking, x-c skiing, fishing, horseback riding, nature study	perpetuity
Robbins Farm Open Space	Town	Conservation Commission	36.86	gift	R-1	Hollis St. and Robbins Farm Rd.	none	future trail devel- opment for hiking, x-c skiing	perpetuity
Sargent Conservation Area	Town	Conservation Commission	3	town	R-1	Main St.	none	fishing, nature study	perpetuity
Sawyer Conservation Area	Town	Conservation Commission	5	gift (Hogg)	R-1	Main St.	none	nature study, wildlife habitat	perpetuity
Shaw Conservation Area	Town	Conservation Commission	3	town	R-1	Pleasant St.	parking for 2 cars, pond view	skating, fishing, picnicking, nature study	perpetuity
Spaulding-Proctor Reservation	Town	Conservation Commission	98	gift (Mason, & Roxbury Latin School)	R-1	Pleasant St. and Groton St.	none	hiking, x-c skiing, horseback riding, fishing, boating, nature study	perpetuity
Unkety Brook Open Space	Town	Conservation Commission	73.09	gift	R-1	Adam, Kemp, and Pleasant Streets	none	hiking, fishing, nature study	perpetuity
Unkety Woods Preserve	Town	Conservation Commission	62	Mass. Self- Help, town	R-1	Woods Court	yes, see ADA Plan in	hiking, x-c skiing Appendix	perpetuity
Urqhart Conservation Area	Town	Conservation Commission	4	tax title	R-1	through Sargent Cons. Area	none	fishing, nature study	perpetuity

Site	Ownership	Management	Acres	Funds Used	Zoning	Public Access	Universal Access	Activities and Use	Degree of Protection
Gage Town Forest	Town	Town Forest Committee	34	gift (Gage)	R-1	none (backland)	none	forestry	perpetuity
Pierce Town Forest	Town	Town Forest Committee	131	town	R-1	Groton St.	none	forestry, hiking, x-c skiing, horseback riding, nature study	perpetuity
Town Fields and Common	Town	Recreation Com. and Parks Dept.	15	town, gifts	R-1	extensive parking at Main St.	yes, see ADA Plan in Appendix	ball sports, tennis	unknown
Larter Field	Town	Recreation Com. and Parks Dept. Larter Field Subcommittee	26.3	gift	R-1	Groton St.	planned, see ADA Plan in Appendix	ball sports, hiking, horseback riding	perpetuity
Horse Hill	Town	Recreation and Parks Dept.	6.25	gift	R-1	Hall St.	none	future game field	perpetuity
Hauk Swamp	Town	Town	6	town	R-1	Depot St.	none	wildlife habitat	unknown
Old Town Wellfield and Old Town Scales	Town	Town	1.5	town	R-1	Pleasant St.	none	water supply	unknown protection
New Town Wellfield	Town	CR held by Cons. Com.	14	town	R-1	limited, through Sargent Cons. Area	none	water supply protection	perpetuity
Blood Cemetery	Town	Cemetery Commission	0.25	town	R-1	River and Hollis Streets	none	cemetery	perpetuity
Central Cemetery	Town	Cemetery Commission	23	town	R-1	Main and Westford Sts.	roadways in cemetery	cemetery	perpetuity
Meeting House Hill Cemetery	Town	Cemetery Commission	0.5	town	R-1	Main St.	none	cemetery	perpetuity
Rideout Cemetery	Town	Cemetery Commission	0.25	town	R-1	Fletcher St.	none	cemetery	perpetuity
Swallow Cemetery	Town	Cemetery Commission	0.25	town	R-1	Brook St.	none	cemetery	perpetuity

Site	Ownership	Management	Acres	Funds Used	Zoning	Public Access	Universal Access	Activities and Use	Degree of Protection
Nashua Valley Railroad Trail	State	Dept. of Environmental Management	24 11.3 miles from Ayer to state line	DEM	R-1	River St. (2 points)	DEM plans to develop access to whole trail	hiking, jogging, bicycling, fishing, horseback riding, x-c skiing	Article 97
Kirkpatrick Land	State	Division of Fisheries and Wildlife	15	DFW	R-1	Hollis St.	yes, with Railroad Trail	hiking, jogging, bicycling, fishing, horseback riding, x-c skiing, boating	Article 97
Hauk Swamp	State	Division of Fisheries and Wildlife	55	DFW	R-1	Depot St.	none	hiking, x-c skiing, nature study, hunting	Article 97
Lahue Parcels	State	Division of Fisheries and Wildlife	13	DFW	R-1	through Farns- worth Refuge	none	hiking, nature study, hunting	Article 97

PRIVATE CONSERVATION and RECREATION LANDS

Site	Ownership	Management	Acres	Funds Used	Zoning	Public Access	Universal Access	Activities and Use	Degree of Protection
Blanchard Hill Conservation Restriction	private	CR held by Cons. Com.	13	gift	R-1	Sky Top Lane	none	wildlife habitat, wetland protection	perpetuity
Kennedy Agricultural Preservation Restriction	private	private	83	state, gift	R-1	none	none	agriculture	perpetuity
Larter Agricultural Preservation Restriction	private	private	130	state, town, gift	R-1	none	none	agriculture	perpetuity
Lowell YMCA Camp	private	YMCA	24.3		R-1a	limited to members	yes hiking, x-c skiing, nature study, archery	nonmotor boating, fishing, swimming, nature study, archery	none

Site	Ownership	Management	Acres	Funds Used	Zoning	Public Access	Universal Access	Activities and Use	Degree of Protection
Old Winslow Schoolhouse	Tyngsborough-Dunstable Historical Society		6	private	R-1	open at certain times	none	historic museum	unknown
Sky Meadow Golf Course	private	CR held by Cons. Com.	60	gift	R-1	through golf course in Nashua	none	hiking, golf	perpetuity
Staples Conservation Restriction #1	Paul Staples (private)	CR held by Conservation Commission	5	gift	R-1	special permission	none	hiking	perpetuity
Staples Conservation Restriction #2	Paul Staples (private)	CR held by Dunstable Rural Lands Trust	10	gift	R-1	special permission	none	hiking	perpetuity
Westford St. Conservation Restriction	private	CR held by Cons. Com.	25.5	gift	R-1	none	none	wildlife habitat, wetland protection	perpetuity

SUMMARY of CONSERVATION / RECREATION LANDS

1,649.42 acres inventoried : 1,596.62 acres permanently protected, 52.8 acres not permanently protected

Public and Nonprofit Lands: 1,292.62 acres

Town Conservation Commission --- 658.77 acres in 26 parcels, acquired as follows:

431.77 acres in 13 parcels acquired by gifts

99 acres in 9 parcels acquired by town funds

62 acres in 1 parcel acquired by Mass. Self-Help and town funds

39 acres in 2 parcels acquired by tax title

27 acres in 1 parcel acquired by town funds and gifts

Town Recreation --- 47.55 acres in 3 parcels (32.55 acres acquired by gifts)

Other Town Lands (forests, cemeteries, wellfields) --- 210.75 acres in 13 parcels (34 acres acquired by gift)

Dunstable Rural Lands Trust --- 268.55 acres in 9 parcels (85.55 acres acquired by gifts)

Mass. Division of Fisheries and Wildlife --- 83 acres in 3 parcels

Mass. Dept. of Environmental Management Nashua Valley Railroad Trail --- 24 acres

Private Permanently Conserved Lands: 326.5 acres in 7 parcels

Private Lands: 30.3 acres YMCA Camp and Historical Society

PRIVATE LANDS: Agriculture : Chapter 61A & APR

Site	Ownership	Acreage	Zoning	Assessor No.	Degree of Protection
Barnes 61A	Dana & Mary Jane Barnes	6.55	Single family resid.(R-1)	12-88/89	temporary
Bentley 61A	H.R. & Emma Bentley	8.9	R-1	17-8	temporary
Bertrand 61A	Christopher & Joyce Bertrand	7	R-1	23-36	temporary
Bridge 61A	William Bridge & Mary Heffernan	12.4	R-1	15-26	temporary
Chaney 61A	Alan & Eugene Chaney	16	R-1 & R-2	17-51	temporary
Davis 61A	Archer & Bertha Davis	36	R-1	11-46/49	temporary
Dumont 61A	Estate of Bernice Dumont	45.2	R-1	16-11/12/13/40	temporary
" "	Leo Jr., Stephen, & Kevin Dumont	45.52	R-1	17-6/6-1	temporary
" "	Leo Jr., Stephen, & Kevin Dumont	9	R-1	17-13/15	temporary
" "	Leo Dumont, Sr.	56.68	R-1	22-15	temporary
" "	Kevin Dumont	5.2	R-1	22-12	temporary
Flowers 61A	Carl Flowers, Jr. Trust	27	R-1	9-17/18/20/21	temporary
Ferrari 61A	Joan Ferrari	159	R-1	11-50/51/81	temporary
Frye 61A	Robert Frye & Susan Lentz	15	R-1	12-83/87	temporary
Holmes 61A	Arthur & Muriel Holmes	20.12	R-1	18-35/41	temporary
Hunter 61A	Earl Hunter & Blanche Clark	14	Exp.Commercial (B-3)	22-52	temporary
Kennedy APR	Robert Kennedy	83	R-1	16/36/37	perpetuity
Larter 61A	Margaret Larter	125	R-1	23-3	temporary
Larter APR	Margaret Larter	130	R-1		perpetuity
Lowder/Roy 61A	Ruth Lowder & Rachel Roy	19	R-1	16-46	temporary
McGovern 61A	George and Susan McGovern	13	R-1	17-137	temporary
" "	George M. McGovern	6	R-1	17-124	temporary
" "	George McGovern, Jr.	6	R-1	17-123	temporary
" "	McGovern Farm, Inc.	29	R-1	17-138	temporary
" "	Hugh McGovern	47	R-1	9-10/13	temporary
" "	Hugh & Roberta McGovern	32	R-1	9-22	temporary

PRIVATE LANDS: Agriculture: Chapter 61A

Site	Ownership	Acreage	Zoning	Assessor No.	Degree of Protection
McGovern 61A	George Jr. & Hugh McGovern	7	Single family resid.(R-1)	9-11	temporary
" "	GRM Realty	20	Exp.Commercial (B-3)	21-3	temporary
" "	H & G Realty Trust	295.71	R-1	1-2/3, 9-1, 6-3, 12-17/19	temporary
" "	HEM Realty	85	R-1	9-9/12	temporary
McLoon 61A	Alan P. McLoon	18	B-3	21-1/7	temporary
" "	Olive McLoon	98	R-1	21-21/29	temporary
Munroe 61A	George and Carol Munroe	62	R-1	8-45	temporary
Palumbo 61A	Michael & Danice Palumbo	29.08	R-1	9-44/48	temporary
Pelletier 61A	George and Ann Pelletier	37	R-1	1-7	temporary
Peterson 61A	Robert & Cheryl Peterson	37.15	R-1	8-36/37	temporary
Staples 61A	Paul Staples	6.93	R-1	18-40	temporary
Sweet 61A	Ernest Sweet & Ernest Sweet, Jr.	28	R-1	12-40	temporary
Trask 61A	Gardner & Faye Trask	17.76	R-1	23-13	temporary

TOTALS: Number of Ownerships: 37 Number of Acres: 1,715.2 Land protected in perpetuity: 213 acres

PRIVATE LANDS: Recreation: Chapter 61B

Site	Ownership	Acreage	Zoning	Assessor No.	Degree of Protection
Carter 61B	Freda Carter	45	R-1	23-1/4	temporary
George 61B	Dorothy George	7.5	R-1	8-4	temporary
Gregg 61B	Catherine Gregg	60	R-1	5-12	temporary
	Hugh Gregg	6	R-1	5-13	temporary
Myette 61B	Peter Myette & Altetporn Ayutaya	9.5	R-1	14-31	temporary
Nelson	Joan Nelson	6	R-1	16-4	temporary

TOTALS: Number of Ownerships 6 Number of Acres 134

PRIVATE LANDS: Forest: Chapter 61

Site	Ownership	Acreage	Zoning	Assessor No.	Degree of Protection
Casella 61	Casella Brothers	7	R-1	9-39	temporary
Chaney 61	Alan Chaney	87	R-1	18-7/8/9, 23-38	temporary
Cover 61	Cover Realty Trust	57	R-1 & B-3	21-4/11	temporary
	Frank Cover	18	B-3	21-2	temporary
Desilets 61	Hilda Desilets	80	R-1	15-39/42	temporary
Dineen 61	Paul & Ann Dineen	19.87	R-1	20-9/25	temporary
Emery 61	Thomas & Patricia Emery	36	R-1	17-120	temporary
George 61	Dorothy George	18.5	R-1	8-4	temporary
Goss 61	Goss Family Land Trust	102	R-1	8-39/43	temporary
	Wesley & Judi Goss	56.95	R-1	7-3	temporary
Greene 61	James & Doris Greene	21.3	R-1	19-1	temporary
	Doris Greene	43	R-1	19-2	temporary
Henry 61	Kathleen Henry	38.65	R-1	15-9	temporary
Kennedy 61	Robert & Claire Kennedy	53.29	R-1	15-2/3	temporary
	Robert Kennedy	22	R-1 & B-3	22-50	temporary
Lahue 61	Naomi Lahue	25	R-1	14-2	temporary
Mason 61	Edward & Jean Mason	17	R-1	9-15	temporary
Sartelle 61	James, Nicholas, & Althea Sartelle	1	R-1	3-3	temporary
Staples 61	Paul Staples	87	R-1	18-38/40	temporary
S.J. L.Trust 61	Dorothy LaCerte	43.6	B-3	22-49	temporary
Treinis 61	Andrew & Julie Treinis	119.1	R-1	6-22	temporary
Tully 61	George E. Tully, Jr.	20	R-1	5-7	temporary
<hr/>					
TOTALS: Number of Ownerships		22	Number of Acres	973.26	

Section 6
Community Goals
Section 7
Analysis of Needs



SECTION 6 - COMMUNITY GOALS

Description of Process

In February 1996, the Conservation Commission undertook the update of their 1976 Open Space and Recreation Master Plan. A planner, Liz Fletcher, was hired. Data was gathered by Commission members, Board of Assessors Secretary Ruth Rogers, and Elaine Basbanes of the Dunstable Rural Lands Trust. Other data sources were the North Middlesex Council of Governments, the Board of Assessors Master Plan Study, the Mass. Department of Environmental Management, the Mass. Division of Fisheries and Wildlife, the Mass. Division of Conservation Services, and the Nashua River Watershed Association. Mass. Geographic Information Services created the updated Open Space Map for the town based on new information provided by Ruth Rogers and Elaine Basbanes. The 1990 Dunstable Rural Landscape and Design Study was also a source of information. Carolyn Wurm of the Recreation Commission coordinated the planning process with the Recreation Commission.

The Conservation Commission as a whole worked as the Open Space Planning Committee, hosting two public meetings to discuss community open space and recreation needs, and to set goals and objectives and recommendations for the five-year action plan. The planner and the Commission met six additional times to discuss planning.

The original 1976 Open Space and Recreation Master Plan forms the basis for this update. Its goals are still worth striving for and its environmental analysis remains an excellent description of Dunstable's natural resources. The philosophy

of recreation described in the 1976 Plan continues to be relevant today.

Statement of Open Space and Recreation Goals

Protecting Dunstable's natural resources and preserving its rural character are the two primary conservation goals of this plan update. An ideal open space system that would achieve these goals would include complete Greenways along Dunstable's major streams, with enlarged conservation lands that are linked into a comprehensive open space network that protects Dunstable's outstanding scenic places and natural resources.

Integral to the achievement of these goals is to increase public awareness of the benefits of conservation, so that there is a common understanding of how investment in land conservation pays dividends in the long run by reducing public service expenditures and enhancing the quality of life.

The primary recreation goals are to provide adequate fields for athletic and other outdoor recreational uses, to provide for a public swimming area, to assure access to the town's water bodies for fishing and boating, and to protect and improve the town's system of trails for foot travel, bicyclers, and horse-back riders.

This plan is intended to serve as a guide to help Dunstable's people take steps to achieve these goals through the recommended actions set forth here.



SECTION 7 - ANALYSIS OF COMMUNITY NEEDS

How close is Dunstable to achieving its conservation goals? All appears well at present, the rural beauty of the town's landscape and the integrity of its natural resources are largely unspoiled. Conservation efforts have made steady progress over the past two decades.

But the rate of land conversion for development is running neck-and-neck with conservation successes. Since 1976, Dunstable has added 1,255 permanently conserved acres of land, an average of nearly 63 acres per year. This is an excellent record, but during this same time land has been divided into 618 lots. Assuming the zoned average of 2 acres per lot, this means that about 1,236 acres have been converted for development over the past two decades, an average of about 62 acres per year.

This closeness between the rates of conservation and development shows that serious efforts need to be sustained, if the desired conservation network is to be protected before opportunities are lost through continual land development. At some point, an ideal piece of land for conservation may be proposed for development instead. Would the town be prepared to act?

If a parcel of open space land comes up for sale, would it make more financial sense for the town to buy it, or to let it be sold for development? This is a very real question that the town of Dunstable may have to face. By law towns have a 120-day option to buy land classified under Chapter 61, 61A, and 61B if that land is proposed for conversion to development. Would it be financially prudent for Dunstable to exercise this option?

The answer is yes, proven in the accompanying Open Space Pays example, using figures from Dunstable's fiscal year 1996. If a 100-acre parcel classified under Chapter 61 were purchased by the town instead of being developed into 40 house lots, the average homeowner would save more than \$82 dollars on their annual tax bill. This is the difference between the cost of acquiring the land (\$29.23 increase to the average tax bill) and the cost of servicing 40 more houses (\$111.44 increase to the average tax bill). Even if the land were not under Chapter 61, but assessed at full market value, which means a larger reduction in the tax base, the annual savings on the average homeowner's tax bill would still be nearly \$75!

Open Space Pays

Land conservation saves taxpayers money. It is less costly for Dunstable than residential growth. The following hypothetical example gives proof using figures from Dunstable's fiscal year 1996. If a 100-acre parcel were purchased by the town instead of being developed into 40 house lots, the average homeowner would save nearly \$75 on their annual tax bill. This is the difference between the cost of acquiring the land (\$36.53 increase to the average tax bill) and the cost of servicing 40 more houses (\$111.44 increase to the average tax bill).

This conclusion is based on the calculations presented in Open Space Pays, by Darryl Caputo, a publication of the New Jersey Department of Environmental Protection. Here is how the calculations apply to Dunstable for fiscal year 1996, using figures from the Board of Assessors and the Annual Town Report:

Dunstable Facts and Figures

1995 population: 2,518

1995-96 children in public schools: 597

School children per unit of development: 1.5 *

FY96 Total Valuation of Property: \$179,734,485

FY96 Total Budget Appropriation: \$2,703,207

School portion of this Appropriation: \$2,122,692

Non-school portion of this Appropriation: \$580,515

School Property Tax Levy per Student: \$3,556

Non-school Property Tax Levy per Person \$230.55

FY96 Tax Rate \$15.04 per \$1,000 valuation

School portion of this Tax Rate \$11.81

Non-school service portion of this Tax Rate \$3.23

* This is North Middlesex Regional Council's estimate for the average 4-bedroom single-family house (typical for Dunstable's new developments). Open Space Pays cites figures from 1.29 to 1.86 school children per house.

The Tax Cost of a 40-home Development

Example: The 100-acre parcel could be developed into 40 units (assuming 20% of acreage is wetland or used for subdivision roads) whose value would be \$212,200 each (median FY96 assessment for new homes). How would this development impact the tax rate?

Annual school cost for development: \$213,360

$$1.5 \times 40 = 60 \text{ students in development} \quad 60 \times \$3,556 = \$213,360$$

Impact on school tax rate: \$12.41 - 11.81 = .60 increase

$$\frac{\$213,360 + \$2,122,692}{\$179,734,485 + (40 \times \$212,200)} = \frac{\$2,336,052}{\$188,222,485} = \$12.41$$

$$\frac{(\text{new school cost with development})}{(\text{new total valuation with development})} = \text{new tax rate}$$

Annual school revenue generated by development: \$105,336

$$\$8,488,000 \text{ (total value of development)} \times 12.41/1,000 = \$105,336$$

Net Annual school cost/benefit of development: \$108,024 cost

$$\$213,360 - \$105,336 = \$108,024 \text{ cost}$$

Non-school service cost of development: \$29,510

$$40 \times 3.2 \text{ (average household size)} = 128 \text{ people in development}$$

$$128 \times \$230.55 = \$29,510$$

Impact on Non-school service tax rate: \$3.24 - 3.23 = .01 increase

$$\frac{\$29,510 + \$580,515}{\$179,734,485 + \$8,488,000} = \frac{\$610,025}{\$188,222,485} = \$3.24 \text{ new tax rate}$$

$$\frac{(\text{new non-school cost with development})}{(\text{new total valuation with development})} = \text{new non-school tax rate}$$

Non-school revenue generated by development: \$27,501

$$\$8,488,000 \times \$3.24/1,000 = \$27,501$$

Net Annual Non-school cost/benefit of development: \$2,009 cost

$$\$29,510 - \$27,501 = \$2,009 \text{ cost}$$

Tax Rate Impact of Development: .60 + .01 = .61

Total New Tax Rate: 15.04 + .61 = \$15.65

Increase in Taxes of Average Homeowner due to this development: \$111.44

$$\$182,681 \text{ (average home valuation)} \times .61/1,000 = \$111.44$$

Value of a break-even house : \$387,970

(valuation equals costs of school and non-school services)

Although some of Dunstable's homes may equal or exceed this value, it is unlikely that developers would fill their subdivisions with homes so far above the market in price.

1.5 school children x \$3,556 = \$5,334 Annual School cost per house

\$29,510 divide by 40 = \$737.75 Non-school service cost per house

$$\frac{\$5,334 + \$737.75}{\$15.65/1,000} = \frac{\$6,071.75}{.01565} = \$387,970$$

The Tax Cost of Preserving Open Space Through Town Acquisition

This same 100-acre parcel is assessed at \$270,000 (\$80,000 for the first 5 acres and \$2,000 per acre for every acre over 5). But because it is classified in Chapter 61, its taxable value is reduced to 5% of its assessment, or \$13,500. (Land in Chapter 61 must have a 10-year forest management plan, and the owners must pay an 8% stumpage value tax at the time of cutting.) The impact on the tax rate is figured both ways, under Chapter 61 assessment (\$13,500) and under full assessment (\$270,000), to give the scope of possibilities. A developer has offered \$300,000 for the parcel. This value is proven out by an appraisal, and is what the town must pay if it chooses to exercise its 120-day option.

Impact of lost revenue on the tax rate: .001 increase (Chapter 61)
.02 increase (full assessment)

\$179,734,485 - \$13,500 = \$179,720,985
total town property valuation without 100-acre parcel (Chapter 61)

$$\frac{\$2,703,207}{\$179,720,985} = \$15.041 \text{ new tax rate without parcel}$$

Tax Cost: .001 (Chapter 61)

\$179,734,485 - \$270,000 = \$179,464,485
total town property valuation without 100-acre parcel (full assessmt)

$$\frac{\$2,703,207}{\$179,464,485} = \$15.06 \text{ new tax rate without parcel}$$

Tax Cost: .02 (full assessment)

Impact of acquisition cost on tax rate: .16 increase (Chapter 61)
.18 increase (full assessment)

Annual payment for 20 years (\$300,000 raised by a 20 year bond at 7% interest):
\$27,911

New budget appropriation including land payment: \$2,731,118

$$\$27,911 + \$2,703,207 = \$2,731,118$$

$$\frac{\$2,731,118}{\$179,720,985} = \$15.196 \quad \$15.196 - \$15.04 = .156 \text{ increase (Chapter 61)}$$

$$\frac{\$2,731,118}{\$179,464,485} = \$15.22 \quad \$15.22 - \$15.04 = .18 \text{ increase (full assessment)}$$

Tax Rate Impact of acquisition (Ch.61): .001+.156=.157

Total New Tax Rate: 15.04 +.16 = \$15.20 (Chapter 61)

Tax Rate Impact of acquisition (full assess): .02+.18=.20

Total New Tax Rate: 15.04 +.20 = \$15.24 (full assessment)

Increase in Taxes of Average Homeowner due to acquisition:
\$29.23 (Chapter 61) \$36.53 (full assessment)

$$\$182,681 \text{ (avg. home valuation)} \times .16 / 1,000 = \$29.23$$

$$\$182,681 \text{ (avg. home valuation)} \times .20 / 1,000 = \$36.53$$

Difference in Tax Costs between Development and Town Acquisition:
\$82.21 (Chapter 61)
\$74.90 (full assess)

Tax Increase of Average Homeowner due to Development: \$111.44

$$\$111.44 - \$29.23 = \$82.21 \text{ (Chapter 61)}$$

$$\$111.44 - \$36.53 = \$74.90 \text{ (full assessment)}$$

Annual Tax Savings to Average Homeowner from acquisition:

\$82.21 (Chapter 61)

\$74.90 (full assessment)

The Open Space Pays analysis shows that town acquisition of a piece of land has a significantly lower impact on the tax rate than the development of that piece. This impact can be reduced still further by state grants from sources such as the Self-Help Fund which is dedicated to assisting communities achieve their conservation and recreation goals. This updated Open Space and Recreation Plan is required to qualify for Self-Help funds. But even without matching funds, conservation acquisition offers a better bargain for Dunstable than land development.

However, no small town can afford to buy all its open land. And there is a legitimate need for housing. The ideal would be that as land changes hands gradually over time, it would be only minimally developed so that the proportion of buildings to open space remains relatively stable. But the market militates against this outcome. The continuation of development to the density allowed by zoning is likely to be inevitable. As a town that wishes to be primarily residential, Dunstable is programmed to experience continual increases in tax costs because residential growth seldom pays for itself. The Open Space Pays analysis shows one way to reduce these cost increases is to acquire land for open space -- laying to rest the still common misconception that land conservation is more costly to a town than growth!

In the 1990 Rural Land Preservation Survey more than 90% of respondents felt that agriculture, riverfront greenways and single family residences were the land uses to encourage and allow. This mixture of uses has excellent potential for protecting the irreplaceable natural qualities of Dunstable, as long as residential use remains in balance with the open space uses.

An ongoing program of land conservation is one way to assure this outcome. Priorities need to be set so that land acquisition funds are targeted to those parcels with the most influence on Dunstable's rural landscape. For this reason, a Strategic Land Acquisition Committee is needed, to set priorities and manage a fund for achieving them.

Dunstable's citizens need to invest in the town's rural character, and create a Strategic Land Acquisition Fund. There is certainly a willingness to do this. In the 1990 Survey, which had a 28% response rate, more than 80% of respondents agreed that Dunstable should be acquiring open space to protect groundwater, rural character, historic and scenic places, and farmland. Furthermore, 79% were willing to spend their tax dollars to do this.

How much of Dunstable should be conserved? Many areas are conservation priorities -- Greenways along the Nashua River and Salmon, Unkety, and Black Brooks; the Gateway to Dunstable along Route 113 east of the town center; hilltops, wildlife habitat, historic places, and farmland. If a 300-foot wide Greenway is completed along the brooks and Route 113, this could add up to 997 acres, based on approximate measurements from the GIS Open Space map. In many areas, a wider Greenway would be needed to include wetlands, their buffers and aquifer recharge areas, especially around the town wellfield. Larger blocks of acreage may need to be conserved to protect fields, wildlife habitats, and the views of hilltops.

However, a 300-foot-wide Greenway along each side of the streams and road is used as a figure that would give significant, if not always sufficient, protection to the resources. The table charts estimated areas and costs for each Greenway.

Greenway	Est. Acres	Est. Cost*
Route 113 Gateway	130	\$1,310,000
Salmon Brook	175	\$350,000
Unkety Brook	414	\$828,000
Black Brook	87	\$174,000
Nashua River	191	\$382,000

* Costs are estimated based on assessing practices: \$64,000 for the first acre of a parcel with road frontage, \$4,000 each for the next 4 acres, and \$2,000 each for all acres beyond that. For the River and brooks, land was estimated at the backland price of \$2,000 per acre.

Most areas falling within a 300-foot-wide band of these streams do not have road frontage. For Route 113, the road frontage values were applied to the acreage, and multiplied by 15, the number of sizable parcels on this stretch.

Of course these Greenways will not become available all at once, but gradually over time on a parcel by parcel basis. These estimated costs are only an indication of the scope of Dunstable's conservation projects, to help people keep in mind the ongoing investment that is needed if Dunstable's rural character is to abide. How will the town look 25 years from now? Think back 25 years!

Summary of Resource Protection Needs

The Salmon Brook Greenway in Dunstable is about half complete, with nearly 5 miles of streambank in conservation land. A strong foundation has been laid for the Unkety Brook Greenway and along Black Brook. However, much of Dunstable's Natural Heritage sites remain unprotected, as do most of the town's outstanding hilltops and the Route 113 Gateway to Dunstable scenic corridor.

Linkages for wildlife corridors need to be made between existing conservation lands. Some important linkages would connect between the Pierce Town Forest and the Spaulding Proctor Reservation, and connect the Farnsworth Wildlife Refuge and Massachusetts Fitch Wildlife Management Area in the Dunstable/Tyngsborough border area with Massapoag and Lower Massapoag Ponds. Salmon Brook's wildlife corridor is well protected along much of the western bank, but long stretches of unconserved land remain along the eastern bank. Dunstable's stretch of the Nashua River, another important wildlife corridor, has very little conservation land.

Dunstable has two significant aquifers along Salmon Brook and Unkety Brook. The town's two-acre residential zoning

would serve to minimize potential contamination to the aquifers, but local zoning allows for use variances, which could conceivably introduce threats to water quality depending on the types of uses that may be granted. An aquifer protection bylaw would give guidance to the Board of Appeals to prevent potentially contaminating uses.

As befits a rural community where agriculture is still active, Dunstable has sizable areas of prime farmland soils. The state has protected parts of these areas through purchasing Agricultural Preservation Restrictions on two local farms, with some town funds and landowner contributions. Many prime farmland soil areas are found on lands classified under Chapter 61A, which indicates that landowners plan to continue farming. The temporary protection for farmland afforded by Chapter 61A can become permanent if the town or a conservation group can exercise the Chapter 61A 120-day option to buy the land if it is proposed to be converted for development. Many areas of prime farmland soils lack even the temporary protection of Chapter 61A.

The town needs to consider establishing a Strategic Land Acquisition Fund to enable acquisitions of APRs and Chapter 61, 61A, and 61B lands as opportunities arise.

How can it be determined which parcels of land would be priorities for land acquisition? The proposed Conservation Matrix in the Appendix sets out possible criteria. The best way to set priorities would be to involve all town boards and commissions, seeking input from them and from private conservation groups such as the Dunstable Rural Land Trust, and private recreation groups such as sports clubs. This plan recommends that an inter-board committee be formed to set priorities and administer a Strategic Land Acquisition Fund -- the Strategic Land Acquisition Committee!

As land development continues, Dunstable's extensive network of wetlands is becoming encroached upon through

building in the wetlands buffers. Building too close to a wetland is a detriment both to the wetland and to the homeowner whose yard becomes flooded when nature takes its course. The Conservation Commission's first attempt to correct this situation was voted down at 1996 Town Meeting due to misunderstanding about the scope of the regulation. Another try to adopt building setbacks in wetlands buffers is well merited.

Summary of the Community's Needs

A Philosophy of Recreation for Dunstable (from the 1976 Open Space and Recreation Master Plan):

Recreation, as it is defined traditionally, developed out of the need to provide urban populations with a substitute for natural activity. It was conceived as a means to provide fresh air, exercise, or relaxation in a pleasant environment. Its social function was to provide a change from monotonous work and also to promote the competitive spirit so honored by the Industrial Revolution. Because of the lack of open space in urban areas, recreation has also developed as a very intensive-use activity.

Dunstable, however, presents a sharp contrast to this. Rather than being a patch of nature in the midst of development, it is a patch of development in the middle of nature. Because of this, recreational activity need not be defined in the narrow traditional sense.

The aim of recreation in any community is to assist in the development of the whole person and in particular to fill in the social gaps that are missing from everyday economic activity. For adults this means providing diversion (activity or relaxation) from work and for children providing opportunities for physical development and socialization.

Recreation should provide opportunities for competitive activ-

ity, as in its traditional role. But it also should be seen as a means to assist in the social development of young people, and, especially in Dunstable's case, to be a means of environmental enjoyment and conservation. Dunstable now supports activity which fits all three categories; therefore recreational planning can build on those activities and organizations which already exist.

Recreation as Organized Competitive Activity: This aspect of recreation includes those competitive team sports which are most familiar: baseball, basketball, football, hockey, tennis, etc. Facilities required are fields and courts and are among the more expensive public recreational facilities to build and maintain.

Recreation as Cooperative Social Activity: This is an area which is not generally considered part of traditional recreation. Even in competitive sports, an underlying theme of recreational activity is the encouragement of the spirit of cooperation in group activity. Unfortunately, this purpose is often subordinated in the competitive pursuit of winning.

From the perspective of the development needs of children, however, this aspect of recreation is very important indeed. In a society of highly specialized economic activity, children have little opportunity to play a constructive role, and instead are set aside into that limbo called "childhood". Integrating children into modern specialized economic activity is almost impossible, but recreational activity can provide opportunities for young people to be "a small partner in a big world," and therefore make a valuable contribution to the development needs of children and adults.

Recreation of this nature covers a wide range of activities and includes a great variety of organizations, for example the Recreation Commission, scouts, 4-H, church and school groups. Roadside litter cleanup is an example of cooperative and socially useful activity among children and adults.

Recreation as Enjoyment of the Natural Environment: One of Dunstable's most valuable assets is its landscape environment. A primary goal of recreation should be to make it easier for people to enjoy that environment both by observing it at close hand and by providing opportunities to understand the natural world as an interrelated living system (ecosystem). In this way recreation is not only enjoyable but serves the purpose of advancing environmental awareness and fostering a deeper appreciation of the value of conservation efforts.

This aspect of recreation has also been found to be the most popular. Perhaps the most thorough study of adult outdoor recreational demand is "Outdoor Recreation for America," prepared by the Outdoor Recreation Resource Review Commission in 1968. The study disclosed that the most popular and most frequently engaged in activities were the "simple activities," those which require the least preparation or specialized equipment. This was true regardless of age, income, education, or occupation.

Here is where the aims of recreation and environmental protection come together, for the provision of facilities for popular simple activities such as walking and bicycling implies protection of open space and the community's visual quality.

Recreation and Environmental Protection: Dunstable offers a substantial opportunity to integrate recreational activity and environmental appreciation and protection. Wetlands protection, for instance can serve as a means of providing an open space system throughout the town, with recreational trails sited along the upland edge of the wetland. This not only provides another reason for preserving wetland areas themselves, but also justifies the acquisition of adjoining upland areas. This both preserves the ecotonal edge for wildlife and sites trails where vegetative and wildlife diversity will be greatest.

One of the most effective methods of fostering appreciation for the environment is by helping people to see why the environment is valuable. Interpretive trails serve this educational function while also providing a recreational resource and a reason to enjoy the out-of-doors. An interpretive trail should be located at a site where a sufficient variety of natural characteristics exist together, so that the length of the trail need not be too long. If possible, the trail should also show the effects that humans have had on the environment, and how nature adapts to this intrusion.

An interpretive trail in a community like Dunstable also can serve as an historical trail, by showing how the land was used early settlers, farmers, and artisans. By comparing how former generations used the land and how we use land today, a lesson can be learned on how today's technology and land use practices have a greater potential for long-term environmental damage.

Ideally, an interpretive trail should be located where it can be easily accessible for use by the schools. At the trail entrance, interpretive text and maps should be available for trail users, either as an exhibit or through pamphlets in a dispenser.

Environmental recreation also allows a greater age integration, with children sharing on an equal footing with adults. It also provides opportunities for socially useful work by young people in preserving the environment, including trail clearing and marking, planting vegetation, constructing necessary facilities and simple maintenance chores. In this way valuable work is performed in the context of play, while advancing environmental protection and the social development of young people. It is certainly a happy coincidence when play and work can be so well integrated.

Today's Community Recreational Needs:

The survey sent to all Dunstable households as part of the 1990 Rural Landscape and Design Study showed preferences for simple recreational activities. The activity ranked most important by town residents was walking (83%), followed by a tie between bicycling and organized athletics (both 73%). Close behind came running (72%) and birdwatching (71%). Four of these five recreational activities are open space based.

At the time of this writing, the Recreation Commission is undertaking a survey to determine today's recreation needs and preferences of townspeople as part of the ongoing Master Planning process. Preliminary results indicate that athletic fields, water-based recreation sites for swimming, boating, and fishing, and trails are the most desired facilities.

Athletic Fields:

The existing playing fields next to the Swallow Union Elementary School, known as the Town Fields, are inadequate to meet the demand. The town was recently given a sizable parcel of land on Groton Street by Margaret Larter. In 1997, the town voted funds to begin the development of new athletic fields at Larter Field, including soccer and baseball fields and a sledding area. Tennis and basketball courts, and a new gymnasium at the Swallow Union School are used by the community. The basketball courts were recently re-done and the tennis courts are slated for an overhaul. Once Larter Field is completed, the need for more athletic fields should be satisfied for the intermediate term. More public fields may still be needed for a variety of recreational uses: the existing field is also used for dog exercising and golf practice, which interfere with other uses.

Swimming Area:

Massapoag Pond offers the best swimming waters in Dunstable. In the past, the town had used a beach on the

Tyngsborough shore, but when this land was up for sale, the town of Tyngsborough would not permit the town of Dunstable to buy it. Now the town has no access to Massapoag Pond for swimming.

The most attainable route for the town to gain some access for swimming in Massapoag may be to approach the Lowell YMCA and work out a possible lease arrangement to allow townspeople to have access to the Y beach during off hours when the camp is less busy. The Y beach is one of the best on the pond. Many residents send their children to the Y camp; discounts are allowed for Dunstable residents to attend.

Fishing and Boating:

The need for more water access for fishing and boating can be accommodated as Greenways grow along the the town's major streams.

Salmon and Unkety Brooks are the two main fishing streams in Dunstable and are stocked each year by the Massachusetts Division of Fisheries and Wildlife. Access along the streams is available on the several conservation sites owned by the town and the Dunstable Rural Land Trust. In addition to stocking the streams, the only facility necessary for improving conditions for fishing on these streams is provision of off-street parking. Winter ice fishing is popular on lower Massapoag Pond.

Salmon Brook is navigable throughout its length in Dunstable by canoe or small boat. It is navigable throughout the year, except during winter ice periods. It is an especially appealing water way for boating, with its meandering course, shoreline variety of marsh and woodland, and untouched natural surroundings. There is a good canoe launch site for Salmon Brook at Main Street, but it lies on private land. The take-out for this stretch lies on Ridge Road in Nashua, NH and its status is unclear.

Dunstable's other navigable stream is the Nashua River. Since no public way crosses the river in Dunstable, and there is only one recently acquired piece of public land which abuts the river, there is as yet little public access to the Nashua River in town. Development of a canoe launch on this Fisheries and Wildlife land would greatly improve people's ability to enjoy this stretch of the Nashua River.

A Dunstable Nashua River canoe access would be helpful from the perspective of novice canoers or families with young children. The Nashua River is free-flowing along this stretch. In Massachusetts, it offers a moderate challenge to those interested in moving beyond flatwater canoeing. But not far over the state line in Hollis, New Hampshire, lie the turbulent rapids at Runnels Bridge. People have been drowned here attempting to ride these rapids in spring runoff. Even at times of lesser flow, Runnels rapids are not advised for novices. A Dunstable canoe access would give people who put in at Pepperell's Covered Bridge launch a chance to enjoy the free-flowing river while avoiding the risk of Runnels rapids.

Now that the Nashua River runs much cleaner, it has possibilities for fishing, although eating the fish is not advisable due to the risk of heavy metals such as lead, mercury, or chromium that may be found in their flesh. Indeed, all freshwater fish appear to have elevated levels of mercury in their flesh, even in pristine areas. The cause is uncertain; it may be airborne pollution from urban areas or incinerators. At any rate, the Dunstable stretch of the Nashua River, although unstocked, may have potential for trout from stocks that have traveled down the Nissitissit. It also has potential for shad, migrating upstream through the fish passages from stocks in the Merrimack River. Even salmon are a possibility -- a large salmon was caught at Runnels Bridge from hatchery stock released in the Merrimack.

Massapoag Pond is the most heavily used recreational water

body in Dunstable, but the town has no public access to this pond. The Division of Fisheries and Wildlife stocks it with tiger muskellunge. There are now no limitations on motor horsepower or speed for boats on Massapoag Pond, other than the state's overall water speed limit of 45 mph. A boating fatality has occurred on Massapoag. The safety of Pond users could benefit from a slower speed limit for motor boats, since it is a rather narrow water body.

Since the shoreline of Massapoag extends into Tyngsborough and Groton, as well as Dunstable, coordination between these three towns would be needed to develop and enforce a boating ordinance for reduced speed limits. State law allows towns to make their own boating regulations for shared water bodies.

Trails:

Many Greenway areas, such as the Spaulding Proctor Reservation, include trail systems, but many of these trails could benefit from improvements such as bridges, marking, and clearing of brush. Dunstable now has an informal bridle path network, on public and private land, but with the greater part on private land. Many of the trails are old logging roads. Riders contact private land owners for permission to use their land. As development occurs, some of these trails may be lost unless provisions are made to preserve them through trail easements in cluster development open spaces.

At this time, the Nashua Valley Rail Trail bicycle path is being developed on the old Ayer to Hollis Depot Railroad line that belongs to the Department of Environmental Management. Stretching 11.3 miles from Ayer to the state line in Dunstable, it follows the Nashua Valley and includes 2 miles near the western border of Dunstable. It is planned to be for non-motorized recreation: bicycles, horses, foot travel. It will be handicapped accessible throughout its length. Citizens from Dunstable and other towns along the route are participating in the planning for this trail.

Another possible bicycle path could be readily created along the stretch of Route 113 between Pepperell and the town center. This stretch has been widened, and there would be room for a bike lane if the state Highway Department would mark it off on the existing pavement. This portion of Route 113 is a popular cycling route and could make a loop ride connecting with the developed Nashua Valley Rail Trail.

The old Red Line Railroad right-of-way that runs north to Nashua along the west side of Salmon Brook's valley is enjoyed by many trail users. It borders the Spaulding Proctor Reservation and other conservation lands along Salmon Brook. Most of this line is now in private hands, and some of its continuity has been lost. It would be good to assure continuing public use of this Rail Trail by working out trail easements or possible transfer of title from landowners.

There is some concern that as snowmobiling and ATVs are becoming popular again, they may disturb non-motorized trail users with their swift and noisy machines. ATVs can pose a threat to water quality through their tendency to erode trail surfaces. Motorized trail siting presents special problems because of the danger inherent to other users of the trail and because of vehicle noise. A separate trail system is almost a necessity.

Since motorized sports extend regionally, the optimum trail system should connect regionally. For safety, it should be clearly identified as a motorized trail.

Power line easements would meet the criteria of regional interconnection and identifiability. Permission would be needed not only from the power companies but also from the owners of the land crossed by the easements. There are about ten miles of easements in Dunstable. Power easements, because of their relative isolation, also have the advantage of keeping motor noise from residential areas.

Motorized trail planning presents special problems, for often the needs of the sport and the rights of affected residents cannot be readily reconciled. Users of these sport machines should be involved in trails planning, to help increase their awareness of the importance of conservation and the concerns of abutters.

Management Needs, Potential Change of Use

Most of the Recreation Commission's programs are centered on organized sports for school-age children. The Dunstable Youth Athletic Association runs a farm league, a little league, a pony league, and youth basketball. Joint Groton-Dunstable clubs associated with the regional school district handle basketball, soccer, and hockey. For adults, there is men's basketball, some volleyball, and some ad hoc co-ed softball.

The ongoing Recreation Commission survey is seeking to ascertain interest in other recreational activities, and to encourage people to come forward and participate in creating new programs for their interests.

Management of both conservation lands and recreation programs could benefit from broader participation by townspeople. Some good recommendations to encourage this were made at the Community Meetings: create a list of projects for volunteers to do for conservation/recreation land management, organize Community Stewardship groups to care for lands in their neighborhoods, and form an Open Space and Recreation Welcoming Committee to meet with new homeowners and encourage them to participate.

Dunstable's recreation programs are run entirely by volunteers, and it is unlikely that the town would hire a full-time recreation director because its population is small. However, since Dunstable and Groton share in the same school district, it may be possible to share in a summer-time recreational pro-

gram where both towns would contribute to the costs of a full-time director.

Two different town commissions are involved with recreational lands: the Recreation Commission oversees programs that use the facilities, and the Parks Commission does the maintenance. Combining these Commissions could lead to more efficient management, because use and maintenance are often closely connected. Communications between the Conservation and Recreation Commissions could be strengthened when these two groups get together to design the list of projects for volunteers to participate in land management.

The threats to Dunstable's natural areas from potential changes of use through development are somewhat abated by the cluster Open Space Residential Development ordinance. This gives a chance to site development away from sensitive areas if people are aware of these areas. Here is where a good system of communication among boards and commissions can be most valuable. Recently a good example occurred where cluster open space was saved for recreational use, thanks to timely input from concerned groups.

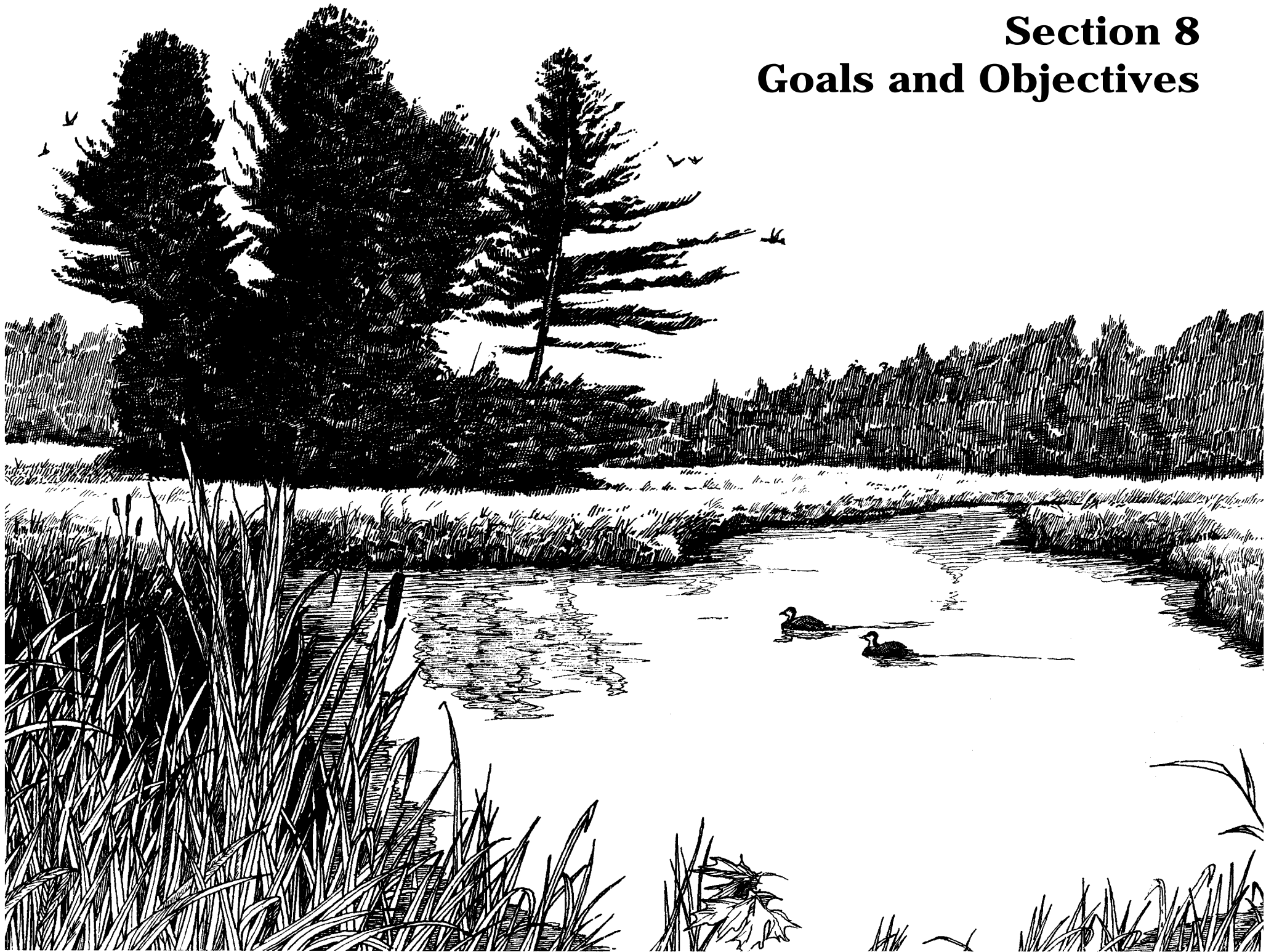
One sensitive pristine area is the Salmon Brook valley from Main Street to the state line. This stretch (2 miles as the crow flies but not as the brook winds) is not now threatened but would be very vulnerable to future disturbance due to its openness and topography. Floating down Salmon Brook is like travelling through a "Great Hall" of nature, where the grand avenue of forested terraces rises up on either side of the rushing brook's luxuriant broad green meadows. Choirs of birds and frogs serenade springtime voyagers. A traditional 300-foot-wide Greenway would not be sufficient to preserve this unusually open undeveloped corridor. The crests of the terraces also need protection to keep this natural cathedral intact, so the chorale of birds and frogs can remain clear, unaccompanied by the growl of motors and other discordant

sounds of daily human existence. Russell Cohen, Rivers Advocate with the Massachusetts Riverways Program of the Division of Fisheries and Wildlife, visited this stretch of Salmon Brook and found that it "is one of the most pristine and unspoiled stream corridors in eastern Massachusetts... something very special, a river corridor in close to primeval condition."

The Dunstable Conservation Commission has worked with local landowners to conserve more than half of this stretch of Salmon Brook. Completing this project deserves top priority.

Section 8

Goals and Objectives



CONSERVATION GOALS and OBJECTIVES

Most of these goals and many of the objectives are continued from the 1976 Plan. Input from the community meetings re-affirmed that these goals and objectives are still worth striving for.

<u>GOAL</u>	<u>OBJECTIVE</u>	<u>ACTION</u>
Protect Water Resources	Protect streambanks and adjoining floodplains.	Continue to acquire conservation land along streambanks, wetlands, and floodplains (Greenways). Focus on increasing Greenways along Salmon, Unkety, and Black Brooks, and the Nashua River.
		Improve mapping for floodplain protection bylaw.
	Protect wetlands and their buffers for their ability to reduce flooding and pollution by functioning as natural storage basins and pollutant modifiers.	Upgrade local Wetlands Protection bylaw to improve protection of wetlands buffers with building setbacks.
	Strengthen development controls which modify peak runoff and reduce pollution risks.	Work with Road Commission to develop design standards to control drainage from driveway entries into existing roads, to protect wetlands by preventing increases in runoff.
	Protect ground water aquifers and critical recharge areas, particularly for Salmon Brook and Unkety Brook.	Adopt an Aquifer Protection bylaw to apply to Salmon Brook and Unkety Brook aquifers.
<hr/>		
Land Conservation Priorities	Complete Greenways along Salmon, Unkety, and Black Brooks, and the Nashua River.	Make progress on land acquisition or conservation easements for all these objectives as opportunities arise.
	Enlarge existing conservation lands, especially Gage Town Forest to include lands with rare species.	
	Link all conservation lands.	

GOAL

OBJECTIVE

ACTION

Preserve important resource lands: scenic areas, farmlands, wildlife habitat, lands with high recreational potential, historic places.

Protect scenic roads including rural roadside views of fields, stone walls, and shade trees, particularly along Route 113 from Tyngs-borough line to town center, the "Gateway to Dunstable".

Acquire scenic easements as a Greenway at least 100 to 300 feet wide where view is protected. If possible, these easements could contain bicycle paths to serve a safety and recreational use.

Encourage the town and landowners to take steps to keep brush from obscuring stone walls.

Preserve Scenic Areas

Protect hilltops to preserve rural landscape views and prevent environmental problems from excessive runoff and erosion.

Amend cluster ordinance (Open Space Residential Development) as recommended by the 1990 Rural Planning and Design Study by IEP, to encourage hilltops to be permanently protected as open space in proposed cluster developments.

Acquire conservation land on hilltops, particularly Forest Hill and Blanchard Hill. Drake Hill, Horse Hill, Spectacle Hill, Nuttings Hill also important.

Consider a Steep Slope Overlay District as a special permit district where site plan review is required for all development. Criteria to be reviewed would be the amount of clear-cutting, slopes of driveways and roads, capability of drainage controls to handle severe storms, and heights of buildings.

Preserve open fields.

Encourage agricultural use through Agricultural Preservation Restrictions (APRs).

Acquire fields for public recreation. Alternatively, the town could lease out acquired fields for open space uses, to provide income to retire the bond issue floated for town land purchase.

GOAL**OBJECTIVE****ACTION**

Preserve important resource lands: scenic areas

Preserve scenic quality in new residential developments.

Adopt incentives for developers to protect scenic resources through allowing flexibility in site planning to spare areas where visibility is high, such as hillsides, fields, shorelines.

Amend cluster ordinance (Open Space Residential Development) as recommended by the 1990 Rural Planning and Design Study to encourage these areas to be permanently protected as open space.

Establish a design review board to raise the general quality of subdivision site design.

Protect Farmlands

Establish a town fund for Strategic Land Acquisition, coordinate among town boards in a Strategic Land Acquisition Committee.

Prioritize lands under Chapter 61A for potential future town acquisition. Set criteria for determining priorities in cooperation with other town boards.

This fund could be used for acquiring Chapter 61A lands proposed for conversion to development, or for town contributions to state purchase of Agricultural Preservation Restrictions (APRs) so farmers can afford to purchase land and keep it in agriculture.

Encourage private economic use of open space through continuing agricultural use.

Protect Wildlife Habitat

Protect rare species habitats.

Acquire conservation land or easements to protect Natural Heritage sites and vernal pools.

GOAL

OBJECTIVE

ACTION

**Preserve important
resource lands:
wildlife habitat**

Preserve wetlands and water bodies, and
contiguous vegetative buffers around them.

Upgrade local Wetlands Protection bylaw with
building setbacks in wetlands buffers.

Prioritize lands under Chapter 61 and 61B for
potential future town acquisition. Set criteria for
determining priorities in cooperation with town
boards on Strategic Land Acquisition committee.

Encourage donations of wetland wildlife habitat for
conservation.

Educate about the value of wetlands and their
buffers for wildlife habitat.

Preserve large blocks of forest land.

Encourage private economic use of open space
through forest management. Encourage more forest
land owners to enroll in Chapter 61. Outreach to
landowners about County Conservation District
and New England Forestry Foundation assistance.

Establish a town fund for Strategic Land
Acquisition, coordinated among all town boards.

Encourage a diversity of plant cover by
educating about ways to foster plant diversity.

Encourage forestry practices that create openings
in forest stands, to encourage sprout growth for
wildlife food. Encourage forestry practices that
lead to mixed stands of hardwoods and conifers.

Encourage leaving dead trees for dens and nests,
the planting of native nut or fruit-bearing trees, and
preserving abandoned orchards where possible.

GOAL

**Preserve important
resource lands:
wildlife habitat**

OBJECTIVE

Encourage a diversity of plant cover.

Protect wildlife habitat when land is
subdivided.

ACTION

Encourage hedgerows along field edges to provide food and cover for small mammals, gamebirds and songbirds, and encourage mixed shrub and sapling growth along the woodland edge of power line rights-of-way.

Manage land owned by the Conservation Commission and the town using these practices.

Adopt design controls in subdivision regulations that address wildlife habitat protection.

**Protect Lands with High
Recreational Potential**

Protect shoreline Greenways that include trails, fishing, boating, and swimming access.

Complete Rail Trails.

Inventory the existing trail network

Acquire water access for fishing and boating through increasing Greenways along Salmon and Unkety Brooks, and the Nashua River.

Acquire town swimming area on Massapoag Pond, or seek partnership with the Y Camp to allow for town public use.

Support state development of a canoe launch on the Nashua River.

Seek trail connections on old Red Line Railway along Salmon Brook.

Support development of bicycle path at existing DEM Nashua Valley Rail Trail (ongoing)

Adopt design controls in subdivision regulations that protect trails.

GOAL**OBJECTIVE****ACTION****Preserve important
resource lands:
Historic Places**

- Consider a Historic District for the town center. Educate how a Historic District can increase local control because regulations under which a Historic District Commission operates are locally determined, setting the design controls to assure that new structures and uses or alterations of existing structures are compatible. The presence of a Historic District influences state highway plans.
- Continue to research all significant historic sites. Dunstable's inventory for the Mass. Historic Commission Registry is 70% complete. Encourage nominations for the National Historic Register for all sites that have national historic potential.

**Educate about conservation
benefits and encourage
more participation in
conservation.**

- Encourage people to join together to promote some aspect of the plan's goals. Organize groups by town regions to take care of lands in each part of town, become volunteer land stewards. Have an Open Space and Recreation Welcoming Committee to meet new homeowners in town to encourage participation.
- Provide more information about existing and potential sites. People need to know about the resources the town has. Update guide map to existing conservation areas, add trails to it; make videos about lands' history and uses, put them in library and on local cable.
- Educate about how saving land saves the town money in the long run. Publicize the tax costs associated with growth vs. the tax costs associated with conservation.

**Strengthen development
controls to protect
environmental resources.**

- Improve local wetlands, floodplain, and other bylaws dealing with environmental issues. Keep informed of improvements to bylaws in neighboring towns. Design and propose measures applicable to Dunstable.
- Encourage adoption of 1990 Rural Landscape Study Zoning Bylaw recommendations. Offer incentives for developers to provide open spaces.

GOAL**OBJECTIVE****ACTION****Improve the use of existing conservation areas**

Develop a list of projects for trails and town conservation/recreation land management, make list available to school groups, scouts, other town groups to encourage their participation in carrying out improvements.

Possible projects to do:

- * Signs on every piece of conservation land with information about use;
- * Bridges and other improvements on trails (especially Bacon Conservation Area);
- * Hikes led by people familiar with the areas;
- * Better control of access to Arched Bridge Conservation Area;
- * Improved parking areas -- enough for 3 cars;
- * Develop management plans for conservation lands based on ecological records and scientific reasoning to protect ecosystems;
- * Maps and information about lands;
- * A home page on the internet describing conservation lands and uses;
- * Gates to prevent dumping.

Increase awareness of the role of hunting as an open space use.

Encourage open space users to take precautions in hunting seasons.

Coordinate town-wide open space protection among town Boards and Commissions

Create a system of coordination among the town boards and interested groups to set priorities for open space acquisition, and to advise on open space when cluster subdivisions and projects needing site plan review are proposed.

Establish a town-wide Strategic Land Acquisition committee to coordinate land acquisition. Acquire 15-20 acres in northern and southern sections of town to hold for future public uses. Coordinate with various boards on their needs when designing cluster open spaces.

Complete Town Comprehensive Master Plan. Include provisions of Open Space and Space Recreation Plan within it.

Assist in gathering data as needed. Incorporate recommendations of updated Open and Recreation Plan into the Master Plan.

RECREATION GOALS and OBJECTIVES

<u>GOAL</u>	<u>OBJECTIVE</u>	<u>ACTION</u>
Meet Dunstable's most important Recreational needs:	(1) More athletic fields	
	(2) Swimming area	
	(3) Water access for Fishing and Boating	
	(4) Keep existing trail system intact for walkers, bicyclers, horses; connect trails throughout region.	
	(5) More diversity in ages and interests represented on Recreation Commission, to address recreational needs of a broad range of people.	
Develop Facilities and/or partnerships to meet recreational needs.	More athletic fields for soccer, baseball, softball, field hockey. More public fields for a variety of outdoor recreational uses	Continue to implement plans for new athletic facilities at Larter Field.
	Water access for Swimming	Develop partnership with Lowell YMCA Camp on Massapoag Pond to allow for use of their beach as a town swimming area during off hours, possibly through a lease arrangement.
	Water access for Fishing and Boating	Support Greenway acquisition along Dunstable's major streams to allow for fishing and boating access.
	Trail improvements	Ask state Highway Department to mark a bike lane on the widened stretch of Route 113 between the Pepperell line and the town center. Advise on ongoing bicycle path development on Nashua Valley Rail Trail

GOAL**OBJECTIVE****ACTION****Develop Facilities and/or partnerships to meet recreational needs.**

Develop a list of volunteer projects for town conservation/recreation land management, make list available to school groups, scouts, other town groups.

Encourage participation of community groups in carrying out projects.

Increase local recreational opportunities in summertime

Consider a summer recreation program directed by part-time staff; recreation director could be shared on a part-time basis with a neighboring town such as Groton.

Roadside park on town land opposite Hawk Swamp on Pleasant Street

Develop for a picnic area, horseshoe games

Riding ring for horses

Explore partnership with the riding barn next to existing town land.

Improve the use of existing recreation facilities

Involve more people in improvements to public recreation facilities

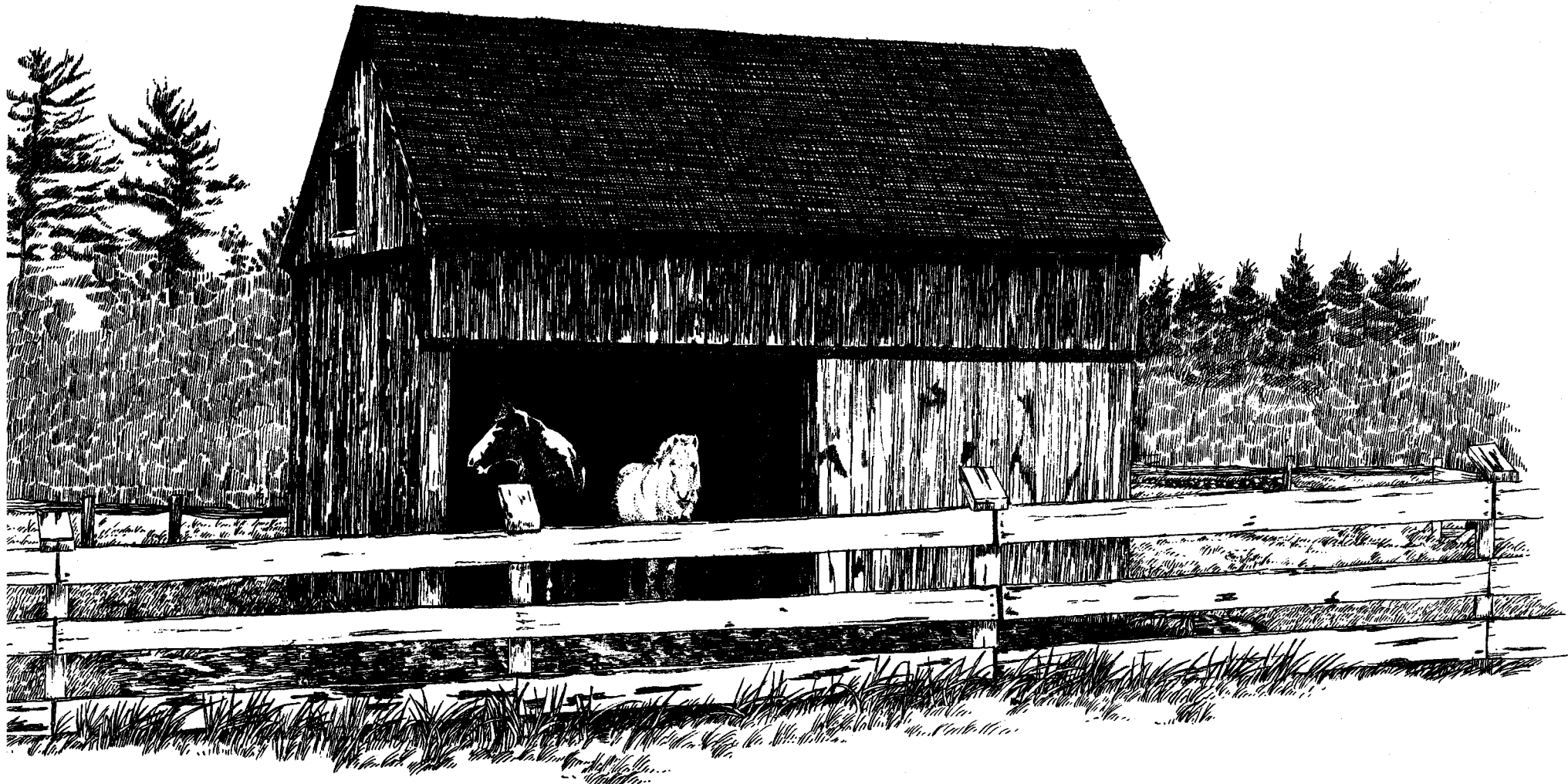
Encourage people to participate in and lead recreational activities. Have an Open Space and Recreation Welcoming Committee to meet with every new homeowner in town to encourage their participation.

Control motorized use on non-motorized-use trails by designating a separate trails system for snowmobile and ATV use.

Bring these users on board to plan this system, to encourage awareness of the importance of open space conservation and abutters' concerns.

Section 9

Five Year Action Plan



FIVE YEAR ACTION PLAN

Years One through Five Continuing Actions: Ongoing Conservation Programs	
Action	Goals/Objectives to be Fulfilled
* Continue to acquire conservation land to increase Greenways along Salmon, Unkety, and Black Brooks. Support state-level conservation for the Nashua River Greenway.	Protect Water Resources and Preserve important resource lands: scenic areas, wildlife habitat, lands with high recreational potential; Water access for fishing and boating.
* Continue to acquire conservation land to protect hilltops, Natural Heritage sites, vernal pools and other wildlife habitats.	Preserve important resource lands: scenic areas, wildlife habitat.
* Continue to support Agricultural Preservation Restrictions (APRs), through town contributions to state acquisition of APRs in Dunstable.	Preserve important resource lands: scenic areas, farmlands.

Year One 1998	
Action	Goals/Objectives to be Fulfilled
* Research Aquifer Protection bylaw models, design such a bylaw to apply to Salmon Brook and Unkety Brook aquifers as mapped by MassGIS.	Protect Water Resources, particularly ground water aquifers and critical recharge areas along Salmon Brook and Unkety Brook.
* Research scenic easement language for a Greenway at least 100 to 300 feet wide along the "Gateway to Dunstable" (Route 113 from the town center to the Tyngsborough line). If possible, these easements could allow for bicycle paths. Begin discussions with landowners.	Preserve important resource lands: scenic areas, farmlands, historic places. Protect scenic roads including rural roadside views with fields, stone walls, and shade trees, particularly the "Gateway to Dunstable".

Action	Year One 1998	Goals/Objectives to be Fulfilled
<ul style="list-style-type: none"> * Design and propose an amendment to local Wetlands Protection bylaw that designates building setbacks in wetlands buffers and eliminates septic system siting in wetlands buffers where soil conditions pose limitations. 		<p>Protect Water Resources, particularly wetlands and their buffers for their ability to reduce flooding and pollution by acting as natural storage basins and pollutant modifiers. Strengthen development controls to protect resources.</p>
<ul style="list-style-type: none"> * Form a town-wide Strategic Land Acquisition Committee to set priorities for and to coordinate land acquisition among all town boards and other groups concerned with public land use, conservation, and recreation. Committee begins its study by seeking input from all concerned, including private community groups such as the Dunstable Rural Land Trust, sports clubs, and recreation groups. 		<p>Coordinate town-wide open space protection among town Boards and Commissions. Create a system of coordination among the town's land use boards to advise on areas to set aside for open space and the uses of open space in proposed cluster developments</p>
<ul style="list-style-type: none"> * Publicize Open Space Plan recommendations, highlighting the comparison of the tax costs associated with growth vs. the tax costs associated with conservation. 		<p>Educate about conservation benefits and encourage more participation in conservation.</p>
<ul style="list-style-type: none"> * Continue to implement plans to develop new athletic facilities at Larter Field. 		<p>Develop Facilities to meet Dunstable's recreational needs: more athletic fields for soccer, baseball, softball, field hockey.</p>
<ul style="list-style-type: none"> * Develop a list of projects for trails and conservation/recreation land management, make list available to school groups, scouts, other town groups to encourage their participation in carrying out improvements. Possible projects for the list: Better maps and guides for existing trails; mark the trails; make signs; build bridges; create small parking areas at existing conservation lands. 		<p>Improve the use of existing conservation/recreation areas. Involve more people in improvements to trails and other public recreation facilities.</p>
<ul style="list-style-type: none"> * Put up signs with use information on at least two pieces of conservation land. 		<p>Improve the use of existing conservation areas.</p>

Action	Year Two 1999	Goals/Objectives to be Fulfilled
* Propose an Aquifer Protection bylaw to apply to Salmon Brook and Unkety Brook aquifers.		Protect Water Resources, particularly ground water aquifers and critical recharge areas along Salmon Brook and Unkety Brook.
* Continue discussions with landowners about scenic easements along the “Gateway to Dunstable” to create a Greenway at least 100 to 300 feet wide. Work out as many easement agreements as possible. Seek funding from state and local sources as needed.		Preserve important resource lands: scenic areas, farmlands, historic places. Protect scenic rural roadside views.
* Town-wide Strategic Land Acquisition committee sets priorities for land acquisition based on input, advises on areas to set aside for open space and the uses of open space in proposed cluster developments. Committee proposes Strategic Land Acquisition Fund, coordinated among all town boards, to be used for acquiring lands identified as priorities.		Coordinate town-wide open space protection.
* Seek to acquire linkages on old Red Line Rail Trail along Salmon Brook, either through trail easements with landowners or acquisition.		Preserve important resource lands with high recreational potential, fulfill Dunstable’s recreational needs. Keep existing trail system intact for walkers, bicyclers, horses; connect trails throughout region.
* Draft amendments to the cluster ordinance (Open Space Residential Development) recommended by the 1990 IEP Rural Planning and Design Study Zoning Bylaw Review, as part of ongoing Master Planning. Include incentives for developers to provide open spaces, allowing flexibility in site planning to protect areas where visibility is high, such as hillsides, fields, shorelines. Also include provisions for protection of wildlife habitat and important resource lands.		Preserve important resource lands: scenic areas, farmlands, wildlife habitat, lands with high recreational potential, historic places. Strengthen development controls to protect environmental resources.

Year Two 1999

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| <ul style="list-style-type: none"> * Assist in the town Comprehensive Master Planning process. Incorporate recommendations of updated Open Space and Recreation Plan into the Master Plan. | <p>Coordinate town-wide open space protection.</p> |
| <ul style="list-style-type: none"> * Complete new athletic facilities at Larter Field. | <p>Develop facilities to meet Dunstable's recreational needs.</p> |
| <ul style="list-style-type: none"> * Organize groups by town regions to take care of parcels in each part of town, become volunteer land stewards to carry out the list of projects for trails and conservation/recreation land management (Community Stewardship Groups). Encourage people of diverse ages and interests to become active with the Conservation and Recreation Commissions. | <p>Educate about conservation benefits and encourage more participation in conservation/recreation, encourage people to join together to promote some aspect of the plan's goals. Improve the use of existing conservation/recreation areas. Involve more people in improvements to trails and public recreation facilities.</p> |
| <ul style="list-style-type: none"> * Put up signs with use information on conservation land. | <p>Follow-up to Year One Actions.</p> |

Year Three 2000

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| <ul style="list-style-type: none"> * Continue to work out agreements with landowners along the "Gateway to Dunstable" for scenic easements to create a Greenway at least 100 to 300 feet wide. Seek funding from state and local sources as needed. | <p>Follow-up to Years One and Two Actions.</p> |
| <ul style="list-style-type: none"> * Strategic Land Acquisition Committee continues its work on behalf of all town boards. | <p>Coordinate town-wide open space protection. Protect Water Resources and preserve important resource lands: scenic areas, farmlands, wildlife habitat, and lands with high recreational potential, historic places.</p> |
| <ul style="list-style-type: none"> * Continue to acquire linkages on old Red Line Rail Trail along Salmon Brook, either through trail easements with landowners or acquisition. | <p></p> |
| <ul style="list-style-type: none"> * Form an Open Space and Recreation Welcoming Committee to meet with every new homeowner in town to explain the town's goals and encourage them to join Community Stewardship Groups, to carry out the list of projects for trails and town conservation/recreation land. | <p>Educate about conservation benefits and encourage more participation in conservation, encourage people to join together to promote some aspect of the plan's goals. Improve the use of existing conservation/recreation areas. Involve more people in improvements to trails, etc.</p> |

<p style="text-align: center;">Year Three 2000</p>

- * Put up signs with use information on at least two pieces of conservation land.
- * Propose amendments to the cluster ordinance (Open Space Residential Development) recommended by the 1990 IEP Rural Planning and Design Study Zoning Bylaw Review, as part of ongoing Master Planning.
- * Develop partnership with Lowell YMCA Camp on Massapoag Pond to allow for use of their beach as a town swimming area during off hours, possibly through a lease arrangement.

Strengthen development controls to protect environmental resources.

Develop partnerships to meet Dunstable's recreational needs for a swimming area.

Action	Year Four 2001	Goals/Objectives to be Fulfilled
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- * Ask state Highway Department to mark a bike lane on the widened stretch of Route 113 between the Pepperell line and the town center.
- * Coordinate with town Parks Commission to develop a wheelchair accessible pathway at Shaw Conservation Area.
- * Continue to work out agreements with landowners along the "Gateway to Dunstable" for scenic easements to create a Greenway at least 100 to 300 feet wide. Seek funding from state and local sources as needed.
- * Strategic Land Acquisition Committee continues its work on behalf of all town boards.
- * Continue to acquire linkages on old Red Line Rail Trail along Salmon Brook.

Fulfill Dunstable's recreational needs for trails.

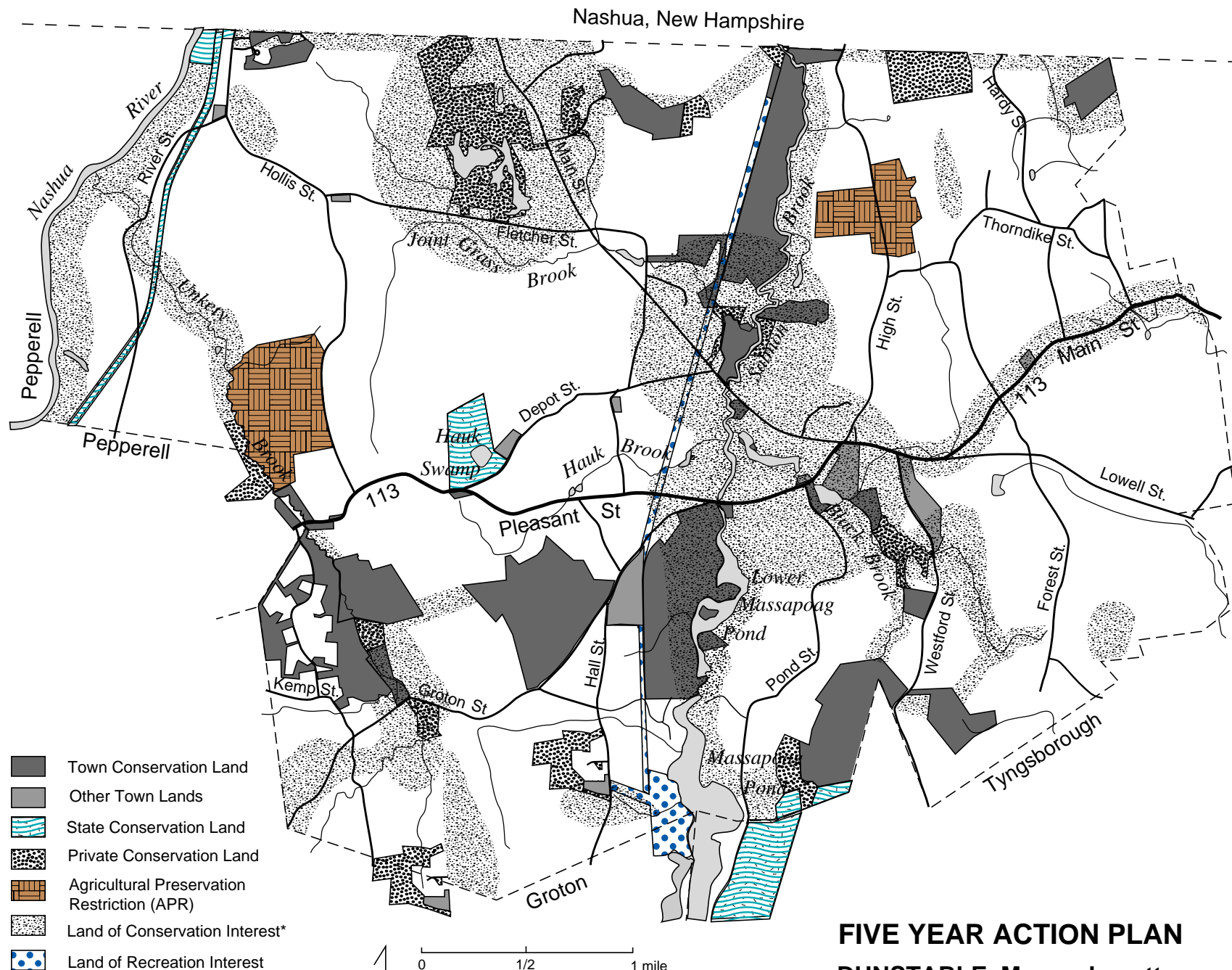
Follow-up to Year Three Actions.

Year Four 2001

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| <ul style="list-style-type: none"> * Community Stewardship Groups continue to improve existing conservation/recreation lands, coordinating with Conservation and Recreation Commissions. * Put up signs with use information on at least two pieces of conservation land. | <p>Follow-up to Year Three Actions.</p> |
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Action	Year Five 2002	Goals/Objectives to be Fulfilled
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| <ul style="list-style-type: none"> * Consider a summer recreation program directed by part-time staff; recreation director could be shared on a part-time basis with a neighboring town such as Groton. * Publicize local use of Lowell YMCA Camp beach on Massapoag Pond as a town swimming area during off hours, if agreement reached with Lowell YMCA. * Continue to work out agreements with landowners along the "Gateway to Dunstable" for scenic easements to create a Greenway at least 100 to 300 feet wide. Seek funding from state and local sources as needed. * Continue to acquire linkages on old Red Line Rail Trail along Salmon Brook, either through trail easements with landowners or acquisition. * Put up signs with use information on at least two pieces of conservation land. | <p>Develop partnerships to meet Dunstable's recreational needs.</p> <p>Follow-up to Year Four Actions.</p> |
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* Includes interim wellhead protection zones, aquifers, rare species habitats, Greenways, hilltops and conservation land linkages.

Note: This map is for planning and educational purposes. Due to its small size, it cannot be used to precisely locate areas on the ground.

FIVE YEAR ACTION PLAN

DUNSTABLE, Massachusetts

Open Space and Recreation Plan 1998

Prepared for the Conservation Commission

FIVE YEAR ACTION PLAN TIMELINE

Year One 1998	Year Two 1999	Year Three 2000	Year Four 2001	Year Five 2002
Land or conservation easement acquisition for Greenways, Gateway to Dunstable, APRs, other important resource lands.				
Wetland Amendments				
Aquifer Protection Bylaw				
Seek Input / Set Priorities / Establish Funding --- Strategic Land Acquisition Committee ---- Coordinate acquisition among boards				
Publicize Open Space Plan, Incorporate into Master Plan				
List of Cons/Rec. Projects / Organize Community Stewardship Groups / Open Space and Recreation Welcoming Committee				
Put up signs on conservation land.				
	Acquire linkages on Red Line Rail Trail.			
	Cluster Bylaw Amendments			
Develop new Larter Field athletic facilities.		Shaw Cons. pathway		
		Lowell YMCA swimming partnership		
			Route 113 Bicycle Lane	
				Summer Program

Section 10
Public Comment
Section 11
References and Appendices



SECTION 10 - PUBLIC COMMENT

The following boards and agencies were sent copies of the draft plan to review and comment upon at the same time the draft was submitted to the Mass. Division of Conservation Services for their review.

Dunstable Board of Selectmen

Dunstable Board of Health

Dunstable Historical Commission

Dunstable Parks Commission

Dunstable Planning Board

Dunstable Recreation Commission

North Middlesex Council of Governments

SECTION 11 - REFERENCES

In addition to the 1976 Dunstable Open Space and Recreation Master Plan, the following people and publications were sources of information and assistance for this plan.

All Members of the Conservation Commission

Margaret Abeyta, Librarian

Walter Alterisio, Board of Selectmen

Elaine Basbanes, Dunstable Rural Land Trust

Dani Carville, Conservation Commission
Secretary

Peggy Church, Historical Commission

Russell Cohen, Riverways Program

Christopher Curry and Robert Flynn, North
Middlesex Council of Governments

Joseph Maguire, Board of Selectmen

Hugh McLaughlin, hydrogeologist for the Town
of Groton

Dominique Pahlavan, MassGIS Data Center

Danice Palumbo, Selectmen's Secretary

Ruth Rogers, Conservation Commission Secretary
(retired)

Jennifer Soper, Division of Conservation Services

Paul Staples, Massapoag Waterwatch Partnership
Monitor

Don Stoddard, Division of Forests and Parks

Mark Vergenis, Mass. Historical Commission

Carolyn Wurm, Recreation Commission

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LIST OF APPENDICES

- Appendix A** Americans with Disabilities Act/ Section 504 Self-Evaluation 15 pages
including documentation
- Appendix B** Minutes of Planning Meetings
- Community Needs Meeting Minutes, April 8, 1996 3 pages
- Community Open Space and Recreation Goals and Objectives Meeting Minutes
May 14, 1996 1 page
- Appendix C** Record of Accomplishments, Analysis of Surveys, Conservation Matrix
- 1976 Dunstable Open Space and Recreation Master Plan Implementation,
Record of Accomplishments Since 1976 3 pages
- Analysis of Community Surveys Done in 1975 and 1990 2 pages
- Proposed Conservation Priority Matrix 2 pages
- Appendix D** Other Documentation
- Letter from Russell Cohen, Rivers Advocate with Massachusetts Riverways Program,
regarding Salmon Brook, April 22, 1996
- List of Historic Sites in Dunstable, from 1976 Plan 3 pages

APPENDIX A

Americans with Disabilities Act / Section 504 Self-Evaluation Open Space and Recreation Plan, Dunstable, Massachusetts

Introduction

The Americans with Disabilities Act (ADA) and Section 504 of the National Rehabilitation Act of 1973 are federal laws that provide for people with disabilities. Section 504 requires all communities to conduct a self-evaluation on all their facilities and programs. All federally-assisted park and recreation programs must comply with these laws. Since many state grant programs also involve federal funds, a community needs to meet ADA/Section 504 requirements to be eligible to receive grants. This ADA/Section 504 Self-Evaluation has been done to enable Dunstable to assess how it has met and plans to meet the needs of the disabled, as part of the town's Open Space and Recreation programs.

The self-evaluation is presented in three parts: Part I, Administrative Requirements; Part II, Program Accessibility; and Part III, Employment Practices. Accompanying documentation includes the recommendations of Dunstable's 1993 Americans with Disabilities Act Study Committee Report, and the Equal Employment Authority clause of the 1991 Personnel Policy Revisions. A Facility Inventory covering all Dunstable's conservation and recreation lands is also included.

Summary of Accomplishments

The town of Dunstable has adopted the recommendations of its Americans with Disabilities Act Study Committee Report of November 1993, as a guide for bringing the town into compliance with ADA. These recommendations address personnel policies, municipal services, and public input. They accompany this Self-Evaluation. Since the Personnel Policy Revisions of September 23, 1991 were adopted, the town of Dunstable has had in place a non-discrimination policy through its Equal Employment Authority clause. Dunstable is a small town having only 7 full-time employees working more than 20 hours a week.

The town of Dunstable complies with ADA/Section 504 by standing ready to offer municipal services needed by the disabled as they request them. It is town policy to provide necessary services when asked by a disabled person, including TDD communications, verbally presented information, and large type.

As new municipal facilities are constructed, and renovations made to existing facilities, the town will include access for the disabled. The Town Hall and Office Building is not wheelchair accessible at present. Wheelchair accessibility will be addressed when Town Hall is renovated after the library moves to its planned new building. In the meantime, town staff are prepared to assist those in wheelchairs needing access to Town Hall when people call ahead to let them know. When classrooms were added to the town's elementary school, wheelchair access was included. The existing Town Field now has disabled access for its playground, ballfields, and basketball court. The new facilities being made for Larter Field include disabled accessibility in their plans.

Part I. Administrative Requirements

1. Designation of ADA/504 Coordinator

Selectman Walter F. Alterisio is Dunstable's ADA Coordinator. He has a depth of experience in this field, having served as chairman of Dunstable's Americans with Disabilities Act Study Committee.

2. Grievance Procedures

These are in place for town employees as part of the Personnel Policy Revision effective September 23, 1991. A copy of this Personnel Policy accompanies this Self-Evaluation.

A similar procedure to address grievances from the public regarding municipal services was adopted by the town on November 17, 1997. The text of Dunstable's "Equal Access to Municipal Facilities and Services" procedure accompanies this Self-Evaluation.

3. Public Notification Requirements

The town of Dunstable has adopted a non-discrimination policy under the Equal Employment Authority of its Personnel Policy.

A similar non-discrimination policy statement to address the general public was adopted by the town on November 17, 1997. It is included as the "Equal Access to Municipal Facilities and Services" policy.

4. Participation of Individuals with Disabilities or Organizations Representing the Disabled

The Town of Dunstable does not have a Commission on Disabilities. When the North Middlesex Council of Governments was contacted for their recommendations on regional organizations, it was discovered that the City of Lowell's Commission on Disabilities was no longer active. Local people familiar with disability issues have been consulted: Mr. Walter Alterisio, Selectman and Chairman of the town's Americans with Disabilities Act Study Committee; and Dunstable's Council on Aging, through Ruth Tully, Elder Assistant.

Part II. Program Accessibility

Dunstable Recreational Facilities

The Dunstable Recreation Commission is a volunteer group whose major focus is on providing organized sports activities for school-aged children. The Commission is involved in a significant project to expand the town's sports opportunities through the development of Larter Field, on land recently given to the town by Margaret Larter. Three parcels of land come under the jurisdiction of the Recreation Commission. In addition to Larter Field that is being developed, there is the existing Town Field. The Horse Hill Quarry parcel is being reserved as a future site for playing fields.

Town Field

In co-operation with the Groton-Dunstable Regional School District, the Recreation Commission oversees athletic programs at the existing Town Field next to the elementary school in the town center. This 15 acre recreation area is maintained with assistance from the School District and Dunstable Highway Department.

Facility Inventory

- Game fields for baseball and soccer

- Basketball court

- Tennis court

- Small playground with swings and wood and tire structure

- Parking area: 50 car capacity shared with school, includes 2 designated handicapped parking places next to ramp near school entrance.

- Pathway: a firm level pathway 4' wide connects the playground to the ball fields and basketball court.

Transition Plan

1. Physical Obstacles: With the pathway connecting the facilities, the game fields, basketball court, and playground at the Town Fields are essentially universally accessible. However, the playground lacks equipment accessible to children with disabilities.
2. Necessary Changes: Playground equipment such as therapeutic swings and therapeutic padding for the play area.
3. Schedule: There are no plans to address these changes at this time.
4. Responsibility: This playground is on town property and is used by the Groton-Dunstable Regional School District. The Dunstable Recreation Commission has assisted in refurbishing the playground. Coordination between the School District and the Recreation Commission would be necessary for future playground improvements.

Larter Field

Dunstable's primary active recreation project at this time is to develop game fields and associated facilities on an 8-acre portion of this 26-acre parcel. The Larter Field Subcommittee of the Recreation Commission is overseeing this project that will transform the portion of the property that was a former gravel removal site into a major town recreation area. They have completed the draft of the Larter Field Master Plan. The 1997 Town Meeting voted funding to proceed with Phase I of the Master Plan. Local athletic clubs such as the Dunstable Youth Athletic Association will also be contributing to the facilities at Larter Field.

The Larter Field area abuts one of Dunstable's largest conservation areas, the Spaulding Proctor Reservation, and includes a stretch of the old Red Line Railroad right-of-way which is presently used as a trail. The Conservation Commission foresees that a connection between these areas offers a great opportunity for a universally accessible nature trail. This plan is described under the section on Dunstable Conservation Areas.

Facility Inventory (planned for Phase I of Larter Field Master Plan)

Game fields for baseball and soccer

Parking area: 60 car capacity would include 3 spaces designated for handicapped

Pathway: A half-mile walkway is planned to extend around the perimeter of the game fields. Part of this walkway would be a firm level pathway 4' wide with less than 5% slope with a hard-packed surface to provide access for wheel-chairs from the parking area to spectator areas, picnic area, drinking fountain, and restrooms.

Restrooms: A septic system is planned to serve the 20' x 40' storage/concession building. Restrooms would include one universally accessible toilet.

Drinking fountains: At least one would be universally accessible

Picnic tables: A picnic area with tables is planned for the central space between the two playing fields, where trees will be planted. At least one table would be accessible from the pathway.

Game field spectator areas: Bleachers will be installed. The central space between the game fields that will be accessible by the firm level pathway will also be used as a spectator area.

Transition Plan is covered in those portions of the Master Plan for Larter Field development that address universal access needs as described above. The plan draft is presently being completed.

Schedule: The sitework was recently put out to bid (September 1997). The schedule for completion would depend on the time frame of the successful bidder.

Responsibility: The Larter Field Subcommittee of the Recreation Commission has responsibility for overseeing the project. Sitework will be done by the contractor who is the successful bidder. Community groups such as the Dunstable Youth Athletic Association will contribute to the facilities through volunteer labor and donating improvements such as picnic tables. The soccer club and baseball club will be contributing to the development of the playing fields.

The 1997 Town Meeting voted to spend \$100,000 for the initial cost of Phase I, which has a total projected cost of \$447,000. This initial funding covers the design and sitework for the playing fields, parking lot, and pathway. Bids submitted for this work are being evaluated in autumn 1997.

The Dunstable Parks Department will provide maintenance for Larter Field, in the form of mowing, trash removal, and road care.

Horse Hill Quarry

This 6.25-acre parcel of land on Hall Street has recently come under the jurisdiction of the Recreation Commission, given to the Commission as part of a private development project on adjoining land. This parcel is an old field (not a quarry) which the Commission intends to keep in reserve as a future site for playing fields. There are no recreational facilities here at present.

Dunstable Conservation Areas

The Dunstable Conservation Commission is responsible for the management of the town's many conservation areas. The members are all volunteers; they are assisted by a part-time secretary whose services are shared with the Planning Board and Water Department. One land management problem the Commission has to deal with is illegal use of and damage to conservation area trails by all-terrain vehicles. A significant part of the Commission's workload is enforcement of the Wetland Protection Act. In coordination with the Dunstable Rural Lands Trust, the community's private, non-profit conservation group, the Commission has sponsored walks on various conservation lands. The Commission also sponsors the Unkety Brook Stream Team, which participates in the Nashua River Watershed Association's Stream Monitoring Program. The Stream Team and the Commission are working together to implement the Action Plan they have devised to protect Unkety Brook.

The ADA/Section 504 Facility Inventory indicates that most of Dunstable's conservation areas are relatively wild and difficult to access, even for the unhandicapped, and so will remain unimproved for universal access. The Commission's long-term goal is to make a place available to the disabled for each of the major activities carried on at conservation areas: trail use, boating, and fishing.

After reviewing its lands, the Commission has determined that the most appropriate areas to make accessible for these activities are the Shaw Conservation Area on Pleasant Street and the Spaulding Proctor Reservation on Groton Street. Transition Plans are presented for these two areas.

Shaw Conservation Area

The Shaw Conservation Area is a very pleasant open space quite close to the town center. Although only 3 acres in size, it offers a variety of outdoor experiences -- fishing on the millpond that is a dammed stretch of Black Brook, exploring the pond and its backwaters by canoe or small boat, strolling along the pond shore, watching the ducks and other wildlife that frequent the pond. With the creation of a shoreline pathway and the addition of a small dock, all these experiences could be made accessible to the handicapped. At present,

there is a usable although not designated handicapped parking space that allows for nature observation at the pond. This space could readily be connected with the shore by a gently graded firm pathway along the open shoreline. The well-mowed grassy slope between the parking area and the pond would present few obstacles for such a path. This path could end at a small dock with handrails which would allow the disabled to enter a small boat or to fish the pond.

Facility Inventory

Millpond with undeveloped shoreline, mostly forested with wetland growth in backwaters (good waterfowl habitat) and mowed grassy slope between parking area and pond

Parking area: 2 car capacity level graveled space edged with logs. Parking on roadside also possible.

Footpath along shore (somewhat rough and narrow)

Transition Plan

1. Physical Obstacles are the lack of a pathway across the grassy slope to the pond shore, and the continuous barrier of logs placed at the edges of the parking area to prevent vehicles from driving on the grass.
2. Necessary Changes: A firm level pathway 4' wide less than 5% slope with hard-packed surface extending from the parking area to the shoreline is needed. One of the parking spaces should be designated as a handicapped space, with a 4-foot wide opening cut through one of the logs near this space to allow access to the pathway. This pathway would connect the parking area with a small dock on the pond. This dock would need handrails to assist with fishing and boating.
3. Schedule for completion: There is no schedule to carry out this plan at this time. The town's park and recreation development efforts are being concentrated on the creation of Larter Field, which is likely to take priority over the next three years. An appropriate time to proceed with making Shaw Conservation Area more accessible to the disabled would be after Larter Field development has been completed.
4. Responsibility: The Conservation Commission has responsibility for managing the Shaw Conservation Area, but the construction of any facilities here would need the support of Town Meeting. The Commission's role would be to present the transition plan to Town Meeting for approval, and then to oversee its implementation once the necessary funds were voted.

Spaulding Proctor Reservation

This 98-acre conservation area has extensive frontage on Lower Massapoag Pond, a ponded stretch of Salmon Brook. Access to Lower Massapoag for the disabled would be extremely difficult to create at Spaulding Proctor Reservation due to the very steep slope that runs from the roadside parking at Jack's Bridge on Pleasant Street down to the canoe launch. Extensive wetland filling would be required to overcome this slope; the Commission determined that boat access for the disabled at Shaw Conservation Area would be more feasible.

Spaulding Proctor's forests have a network of trails and woods roads that are accessible from Groton Street and the old Red Line Railroad right-of-way, which is presently used by all-terrain and other motorized vehicles. This motorized accessibility creates a problem within the Reservation, causing trail erosion and rutting, and risks to the safety and enjoyment of other trail users. It is an ongoing effort to police and prevent motorized use on the Reservation's trails. Because much of the railroad right-of-way is privately owned, it is very difficult to prevent motorized use, so that it would not be appropriate to develop the Reservation's existing trail system for the disabled.

However, the Conservation Commission foresees that the town-owned portion of the old Red Line Railroad which abuts Larter Field offers a great opportunity to connect the Field with Spaulding Proctor Reservation, in a way that would make it possible for the disabled to experience the beauty of this natural area in safety. Motorized access on the town's stretch of the railroad can be controlled, so that it can link the universally accessible pathway at Larter Field with a nature trail loop that can be created in the Reservation.

Facility Inventory

Large forested area on Massapoag Pond, abutting the old Red Line Railroad and Larter Field.

Land access: several woods roads that are difficult to control against access by off-road vehicles.

Water access: canoe launch at Jack's Bridge on Pleasant Street, at bottom of steep slope next to bridge, roadside parking.

Transition Plan

1. Physical Obstacles are the difficulty of controlling motorized use of private former railroad right-of-way, which connects with existing Reservation woods roads and trails.
2. Necessary Changes: Control motorized access to town's stretch of railroad, connect with Larter Field's pathway that will be disabled-accessible. Grade railroad to create a firm level pathway 4 feet wide with less than 5% slope (hard-packed surface) linking Larter Field pathway with a disabled-accessible nature trail loop to be constructed in Spaulding Proctor Reservation.
3. Schedule for completion: There is no schedule to carry out this plan at this time. The town's park and recreation development efforts are being concentrated on the creation of Larter Field, which is likely to take priority over the next three years. Because the proposed Spaulding Proctor nature trail loop would be an extension of the Larter Field pathway, Larter Field development must be completed first. Since the Shaw Conservation Area is more visible to the public and nearer the town center, it may be appropriate to proceed with making this area more accessible to the disabled prior to creating the Spaulding Proctor nature trail.
4. Responsibility: The Conservation Commission has responsibility for managing the Spaulding Proctor Reservation but the construction of any facilities here would need the support of Town Meeting. The Commission's role would be to present the transition plan to Town Meeting for approval, and then to oversee its implementation once the necessary funds were voted.

Unkety Woods Preserve

The Conservation Commission has just acquired this 62-acre Christmas tree farm on Unkety Brook with the assistance of a Massachusetts Self-Help Fund grant. The property includes mowed paths suitable for universal use that lead from the 15-car parking area. The Conservation Commission's Management Plan states that trails will be mowed and surfaces maintained in a passable condition.

Part III. Employment Practices

1. Recruitment

A. Job announcements include a non-discrimination statement. They are posted in accessible areas such as the Town Hall and Post Office, and are advertised in regional newspapers such as the Lowell Sun and the Groton Landmark. Job announcements are made available in auditory form; they can be read to prospective applicants upon request. No recent job announcements are available.

B. Interviews address the applicant's qualifications for the job. The job's essential functions, physical needs, education and experience requirements are discussed. It is illegal to inquire about an applicant's disability and its severity; this is not discussed in an interview.

2. Personnel Actions

The Personnel Policy Revisions of September 23, 1991 cover responsibility, equal employment authority, employment status, orientation, job descriptions, holiday, vacation, and sick pay, personal days, bereavement leave, and the grievance procedure. The non-discrimination policy set forth in the equal employment authority applies to all provisions of the Personnel Policy.

As far as the town is aware, none of Dunstable's 7 full-time town employees have disabilities.

3. Leave Administration

Policies for granting leave do not adversely affect qualified employees with disabilities. The non-discrimination policy set forth in the equal employment authority applies to leave policies.

4. Training

The 180-day orientation period included in the town's Personnel Policy allows both the employee and those responsible for direct supervision to evaluate skills and abilities appropriate for the job position. This policy would provide for training to be administered in a manner that allows equal participation by qualified employees with disabilities.

5. Tests: The town of Dunstable does not administer tests for jobs.

6. Medical Examinations/Questionnaires

The town of Dunstable does not administer pre-employment medical examinations at present. This option will be researched by a Personnel Committee that the Selectmen are forming. As recommended by the town's ADA Study Committee, pre-employment medical examinations would be implemented only after conditional employment offers are made. Written job descriptions would accompany the individual, to which the examining physician can refer to affirm that the applicant can satisfy all requirements without undue risk to self and others.

7. Social/Recreational Programs

As the need arises, community sponsored programs will be made accessible to employees with disabilities.

8. Fringe Benefits

Employees who work more than 20 hours a week are eligible for health insurance. Employees with disabilities will receive the same employee benefits as non-disabled employees.

9. Collective Bargaining Agreements: Dunstable's town employees are not unionized.

10. Wage and Salary Administration

Compensation depends on the title and classification of the individual's job. Employees with disabilities will not be offered different rates of compensation solely on the basis of disability.

**FACILITY INVENTORY of TOWN CONSERVATION and RECREATION AREAS
for Americans with Disabilities Act/Section 504 Self-Evaluation**

				ADA/504 ACCESSIBILITY TRANSITION PLAN		
SITE	Management	Acres	Location	Improved to Standard	Improvements Planned	Unimproved (give reason)
Town Field and Common	Recreation Com. and Parks Dept.	15	Main St.	Yes, accessible pathway to spectator area, game fields, basketball court, playground		
Larter Field	Recreation Com. and Parks Dept. Larter Field Subcommittee	26.3	Groton St.		Parking, walkway, plumbing, picnic tables, game fields, spectator area are all part of planned site development	
Horse Hill Quarry	Recreation Commission	6.25	Hall St.		Future potential site for game fields. No improvements planned at present; town is working on Larter Field development.	
Shaw Conservation Area	Conservation Commission	3	Pleasant St.	Yes, parking for pond viewing, nature study	Pathway for fishing access along shore; also, small dock for canoe access	
Unkety Woods Preserve	Conservation Commission	62	Woods Court	Yes, mowed paths accessible from 15-car parking area		
Spaulding-Proctor Reservation	Conservation Commission	98	Pleasant St. & Groton St.		Nature trail loop connecting with Larter Field walkway along Red Line Rail Trail bordering Larter Field	
Arched Bridge Conservation Area	Conservation Commission	12	High Street			access to bridge very rough, distant from town road; Salmon Brook launch unsuitable because no accessible take-out downstream.

				ADA/504 ACCESSIBILITY TRANSITION PLAN		
SITE	Management	Acres	Location	Improved to Standard	Improvements Planned	Unimproved (give reason)
Bacon Conservation Area	Conservation Commission	14	off Main St.			backland, no formal paths, across brook from Town Field
Biron Conservation Area	Conservation Commission	10	Westford St.			no formal pathways, steep slopes
Blanchard Hill Open Space	Conservation Commission	39.38	Sky Top Lane			no formal pathways wildlife habitat
Blue Heron	Conserv. Com.	2	Pleasant St.			steep beside bridge
Chapman Conservation Area	Conservation Commission	1.7	Pleasant St.			no formal pathways, wetland
Craven Conservation Area	Conservation Commission	2	Pleasant St.			no formal pathways, wetland
English Wildlife Refuge	Conservation Commission	34	Westford St.			no formal pathways, wild with sizable wetlands
Farnsworth Wildlife Refuge	Conservation Commission	96.3	Westford St.			no formal pathways, wild rough steep slopes
Fox Run	Conserv. Com.	2.14	off Main St.			backland
Gardner Conservation Area	Conservation Commission	3	Pleasant St.			no formal pathways, wetland
Goldthwaite Conservation Area	Conservation Commission	1.3	Lower Mass-apoag Pond			backland, accessible by boat only
Holmes Conservation Area	Conservation Commission	5	Lower Mass-apoag Pond			backland, accessible by boat only

				ADA/504 ACCESSIBILITY TRANSITION PLAN		
SITE	Management	Acres	Location	Improved to Standard	Improvements Planned	Unimproved (give reason)
Hogg Conservation Area	Conservation Commission	27	Lower Mass- apoag Pond			backland, accessible by boat only
Jointgrass Brook Conservation Area	Conservation Commission	21	Mill and Swallow St.			wetland
Kennedy Conservation Area	Conservation Commission	50	off High St.			backland, across Salmon Brook from Arched Bridge Cons. Area
Keyes Meadow Conservation Area	Conservation Commission	18	Groton St.			no formal pathways, wetland
Proctor Conservation Area	Conservation Commission	35	off High St.			backland, south of Kennedy Cons. Area
Robbins Farm	Conserv. Com.	36.86	Hollis St.			no formal pathways
Sargent Conservation Area	Conservation Commission	3	Main St.			no formal pathways, wetland
Sawyer Conservation Area	Conservation Commission	5	Main St.			no formal pathways, wetland
Unkety Brook Open Space	Conservation Commission	73.09	Pleasant and Kemp Streets			no formal pathways wildlife habitat
Urqhart Conservation Area	Conservation Commission	4	off Main St.			backland, behind Sargent Cons. Area
Gage Town Forest	Town Forest Com.	34	off Hardy St.			backland
Pierce Town Forest	Town Forest Committee	131	Groton St.			woods roads unsuitable for disabled access (used by logging trucks and off-road vehicles)
Hauk Swamp	Town	6	Depot St.			wetland

Appendix B Minutes of Planning Meetings

Community Needs Meeting Minutes, April 8, 1996 3 pages

Community Open Space and Recreation Goals and Objectives Meeting Minutes, May 14, 1996 1 page

Community Needs Meeting April 8, 1996

The Conservation Commission hosted this meeting to get input on community needs for the Open Space and Recreation Plan update. Present were members of the Recreation Commission, the Library, the Board of Health, the Board of Assessors, Dunstable Rural Lands Trust, and other Dunstable citizens: Margaret Abeyta, Cathy Bence, Carol Bacon, Elaine Basbanes, Peggy Church, Warren Church, Robert Kennedy, Jody Harney, Carolyn Wurm, Jon Podgorni, Brian Locapo, Peter Galvin, Dick Henry, Michael Oliveira, Elizabeth Oliveira, Max M. Curtis.

So that people could familiarize themselves with the issues, planner Liz Fletcher presented fact sheets that she had prepared based on data from the North Middlesex Council of Governments, the Board of Health, the Board of Assessors, and Conservation Commission volunteers. These fact sheets cover Dunstable's Demographics, Land Uses, Development Patterns (with Regional Comparison of Housing Value, Income, and Taxes), Infrastructure, Potential Environmental Problems, and the Results of Previous Surveys (1975 Open Space Plan Survey and 1990 Rural Landscape Preservation Survey).

The draft updated GIS Map of Dunstable was displayed, showing public and private conservation land, and Chapter 61, 61A, 61B land.

The following seven questions were discussed, and Ms. Fletcher recorded the ideas that were put forth on a large pad so that everyone could see the suggestions as they were recorded.

1. What are Dunstable's most important kinds of Open Space to protect?

Hilltops -- views of hilltops are as important as views from hilltops; houses on hilltops ruin views for others

Water Resources

Lands along rivers, brooks, and ponds

Fields along Route 113 are most visible and significant for rural character

1. Complete Greenway Corridors

2. Enlarge existing conservation lands

3. Link all conservation lands

Lands under Chapters 61, 61A, 61B should be prioritized for potential future town acquisition as opportunities arise

Recreational open spaces, especially trail connections

2. What specific places should be priorities?

Primary Priorities ---1. Complete Greenway Corridors

2. Enlarge existing conservation lands

3. Link all conservation lands

Blanchard Hill, Drake Hill, Horse Hill, Spectal Hill, Nuttings Hill -- all hills in general

Potential aquifer along Unkety Brook is town's only other major aquifer beside Salmon Brook

Lands along the Nashua River and Salmon Brook, link with Rail Trails, complete Rail Trail on Salmon Brook from Nashua to Groton (Red Line)

Lands along Unkety Brook

Public access to Nashua River and Massapoag Pond. Work with Cambridge YMCA on Massapoag access, nothing happens at camp on weekends

Black Brook system in the town center, protect for recreation and conservation

Linkage to Gage Town Forest, includes rare reptiles, birds

Whatever is available -- prioritize by availability

3. What steps should be taken to protect open spaces?

More information about existing and potential sites: map trails and linkages, make guides to existing conservation areas, videos about their history and uses. Put them in the library and on local cable. People need to know about the resources the town has.

Investigate tax costs and benefits of saving open space

Better publicity about how saving land saves the town money in the long run

Upgrade local wetlands, floodplain, and other bylaws dealing with environmental issues

Offer incentives for developers to provide open spaces

Town could purchase agricultural development rights so that farmers can purchase farmland on the market, keep it in agriculture

4. What can be done to improve the use of existing conservation areas?

More information as above.

Also, a home page on the internet describing Dunstable's conservation lands and uses, index this information

Signs on every piece of conservation land with information about use

Clear and improved parking areas -- not big but enough for 3 cars

Increase awareness of the role of hunting as an open space use, encourage precautions in hunting seasons.

Hikes led by people familiar with the areas. Dunstable Rural Lands Trust is having 4 walks in May.

Gates to prevent dumping.

Better control of access to Arched Bridge Conservation Area

5. What are Dunstable's most important Recreational needs?

Swimming access

Access to fishing areas

Keep existing trail system intact for walkers, bicyclers, horses. Some is on private land.

More athletic fields, existing field is over-used

6. What facilities need to be developed ?

More athletic fields for soccer, baseball, softball, field hockey

More public fields for a variety of outdoor recreational uses: existing field also used for dog exercising, golf practice -- interferes with other uses.

Public horseshoe area

Picnic Areas

Roadside park on town land opposite Hawk Swamp on Pleasant Street could be developed for picnic area, horseshoe games

Riding ring for horses

Improved library

7. What can be done to improve the use of existing recreation facilities?

Post against and control motorized trail use

Better maps and guides for existing trails

Bridges on trails in conservation areas wherever needed (especially Bacon Conservation Area)

Partnerships with local private facilities to arrange for town public use, especially the Y Camp and the riding barn next to existing town land.

Community Open Space and Recreation Goals and Objectives Meeting

May 14, 1996

The Conservation Commission hosted this public meeting to discuss proposed goals and objectives for the Open Space and Recreation Plan update, and formulate a five-year action plan. Present were Carolyn Wurm of the Recreation Commission, and other Dunstable citizens: Michael Oliveira, Elizabeth Oliveira, Bob Parker, Anne Parker, Jeff Hannaford, and Ken Tully.

Planner Liz Fletcher presented maps showing the natural resources and open space lands of Dunstable. The updated map of public and private conservation lands, and Chapter 61, 61A, 61B lands was recently completed by MassGIS, based on data provided by Elaine Basbanes and Ruth Rogers. This GIS Open Space map colorfully shows a significant network of open space lands. Liz had colored the soils map of the town to show wetland soils, prime farmland soils, and steep slopes. These slopes are scattered throughout the town, and sizable blocks of prime farmland soils are prevalent in many areas. Wetlands interlace the whole town along all its streams, with a major wetland system in the northwest corner of Dunstable, as well as others along Salmon and Unkety Brooks and some larger ones such as Hawk Swamp.

Dunstable has an ambitious goal of completing Greenways along its major streams, and enlarging and linking existing conservation lands. The Conservation Commission and the Dunstable Rural Lands Trust have been engaged in this project with many successes over the past 20 years. Many key parcels are conserved, but much remains to be done.

To give people a feeling for the scope of this project, Liz had colored a copy of the GIS Open Space map to illustrate the lands conserved and the gaps and possible links. To help people understand the possible financial commitment needed to achieve this goal, Liz presented a theoretical scenario with some figures on acreage and costs if Greenways 300 feet wide on either side of Salmon Brook and on Route 113 (the Gateway to Dunstable) were to be acquired all at once. This could cost \$1.66 million based on Assessor's per-acre figures, if the 175 acres needed to complete the Salmon Brook Greenway and the 130 acres along Route 113 from the Tyngsborough line to the town center were purchased. If this money were raised through a 20-year bond at 7% interest, this would mean a \$121,880 yearly payment. Adding in the loss to the tax rolls from this conserved acreage (\$19,700) this would mean an increase to the average taxpayer of \$157 for 20 years, given an estimated 900 taxpayers in Dunstable.

Protection of Dunstable's rural character will likely involve an investment of this scope. Because Dunstable's natural resources are so outstanding, some help from state matching funds could be forthcoming if the town has an up to date Open Space and Recreation Plan.

All present had copies of the proposed Goals and Objectives, compiled from the existing 1976 Plan, the input from the Community Needs meeting on April 8th, and input from Conservation Commission members. The meeting set priorities from among these goals and objectives and selected actions for the Five Year Action Plan. It was agreed that all goals were important, and at least one action under each goal should be included in the Five Year Action Plan. Although some of the objectives and actions would have less priority, they should be included in the plan because they merit future consideration.

The goals, objectives, and five year actions that were discussed are not listed here because they all appear under Section 8- Goals and Objectives in the plan document.

Appendix C Record of Accomplishments, Analysis of Surveys, Conservation Matrix

1976 Dunstable Open Space and Recreation Master Plan Implementation,
Record of Accomplishments Since 1976 3 pages

Analysis of Community Surveys Done in 1975 and 1990 2 pages

Proposed Conservation Priority Matrix 2 pages

1976 DUNSTABLE OPEN SPACE AND RECREATION MASTER PLAN IMPLEMENTATION

Record of Accomplishments Since 1976

This record is compiled from discussion at the March 11, 1996 Conservation Commission meeting, and subsequent input.

<u>RECOMMENDED ACTION</u>	<u>DONE</u>	<u>ONGOING</u>	<u>NOT DONE</u>
Planning and Education			
Town-wide Comprehensive Plan		✓	
Adopt cluster zoning	✓		
Review cluster zoning performance			✓
Inventory historic resources	✓	✓	
Establish Historic District in town center			✓
Create a design review board			✓
Develop a town common focus area		✓	
Phased growth ordinance	✓		
Stricter sign controls	✓	✓	
Revise gravel removal ordinance	✓		
Adopt sidewalk requirements to encourage bikeways			✓
Designate scenic roads (scenic roads bylaw covers all except Route 113)	✓		
Soils mapping	✓ (but not published)		
Environmental education in elementary school	✓	✓	
Promote Chapter 61, 61A, 61B assessment for open space land uses	✓		
Promote forest management for private landowners	✓	✓	

Record of Accomplishments Since 1976

RECOMMENDED ACTION	DONE	ONGOING	NOT DONE
Land Conservation			
Acquire land or conservation restrictions for Greenways on:			
Salmon Brook	✓	✓	
Unkety Brook	✓	✓	
Nashua River	✓	✓	
Acquire conservation lands:			
Kenny site on Fletcher Street	✓ (Dunstable Rural Lands Trust)		
Brow lot	✓		
Shaw's Pond	✓		
Hauk Swamp	✓		
Forest Hill (20 acres on top has been developed)			✓
Acquire farm development rights (Agricultural Preservation Restrictions)	✓ (2)		
Form a Dunstable Land Conservation Trust (Dunstable Rural Lands Trust)	✓		
Establish a Conservation Fund	✓		
Hire town conservation assistant	✓		
Encourage a volunteer land management corps (Scouts)		✓	
Forest management for Town Forests	✓		
State Scenic River designation for			
Nashua River	✓		
Salmon and Unkety Brooks			✓
Create town-wide interpretive nature trail		✓	

Record of Accomplishments Since 1976

RECOMMENDED ACTION	DONE	ONGOING	NOT DONE
Water Resource Protection			
Wetlands zoning		✓	
Wetlands mapping			✓
Assessors maps with wetlands shown			✓
Promote Wetlands protection (brochure)	✓		
Wetland drainage easements granted to town in new subdivisions	✓		
Strengthen septic system regulations	✓		
Improve subdivision drainage regulations	✓		
300-foot setback from streams and ponds			✓
Flood monitoring with Army Corps of Engineers			✓
Acquire land to protect water supply aquifer	✓	✓	
Coordinate with area towns on watershed management (Dunst.& Pepp.water depts communicating on Reedy Meadow aquifer?)			
Recreation			
Railroad rights of way for trails (Nashua Valley Rail Trail, and 1,000 feet on north end of Red Line on Salmon Brook)	✓		
Form Trails Committee (for Nashua Valley Rail Trail only)		✓	
Construct bikeways		✓ (same as above)	
Easements for bikeways along existing roads			✓
Make a summer camp on conservation land			✓
Acquire and develop swimming beach site on Massapoag or other pond			✓
Coordinate with area towns on Massapoag boating policy (Mass. Envir. Law Enforcemt. has no special regs. for Massapoag)			✓
Trails at new school building site	✓		
Recreation provided by local semi-public groups for children and teens (Scouts, 4-H, school clubs) and adults (clubs)	✓	✓	

Analysis of Community Surveys Done in 1975 and 1990

Themes in Common, 1975 and 1990

Some common concerns were expressed in both surveys: support for greenways (land adjoining streams, particularly Salmon and Unkety Brooks); protection for the town center and historic sites; support for strong zoning. There was increasing concern for agricultural protection, perhaps due to losses of farmland over the 15 years. In 1975, zoning and subdivision control were the preferred approaches for protecting natural areas. In 1990, stronger support for open space acquisition was expressed. To back up their support, 1990 respondents expressed strong willingness to fund acquisition with their tax dollars. Swimming, the most popular activity in 1975, appeared to be less so in 1990, but this may be due to the way the 1990 question was phrased -- the importance of having space for recreational opportunities. In 1990, more households may have swimming pools, reducing the need for space for a town beach. Walking and bicycling were in the top 3 activities in both surveys; organized sports ranked high in 1990.

	1975	1990	
Surveys sent out	450	725	(Approximately one to each household)
Surveys returned	149	201	
Response rate	33%	28%	

1975 Conservation/Recreation Survey: Summary of Answers

What types of areas are most important for the Conservation Commission to acquire or protect?

Wildlife habitats	77%	Farmlands	53%
Woodland	66%	Wetlands	52%
Land adjoining streams and ponds	60%		

What specific areas of Dunstable deserve special priority for protection?

Massapoag Pond shoreline	73%	Unkety Brook watershed	52%
Salmon Brook watershed	69%	Historical areas	51%
Dunstable Center	61%		

What approach should the town use in protecting natural areas?

Zoning and subdivision control	83%	Purchase of protective easements	60%
Wetlands protection ordinances	70%		
Town purchase with reimbursement from state and federal sources	68%		

What uses should be emphasized for existing or future conservation land?

Manage as wildlife refuges, nature study areas, and for scenic enjoyment	67%
Develop trail systems for hiking, horseback riding, cross-country skiing	55%
Develop active recreational uses (swimming, ballfields, tennis)	38%

The most popular recreational activities, ranked by number of annual days of participation:

Swimming: 7,146 days Walking: 6,307 days Bicycling: 4,578 days Horseback riding: 3,612 days Pleasure driving: 3,413 days

1990 Rural Land Preservation Survey: Summary of Answers

Rank the three most important reasons for living in Dunstable:

Dunstable's natural features: 82%

Town's rural character: 68%

Proximity to Route 3: 29%

Land uses that should be encouraged or allowed:

Agriculture 93%

Protect riverfronts with greenway 93% (Nashua River, Salmon Brook, Unkety Brook)

Single family residence 91%

Senior citizen housing 78%

Keep town center as it is 77%

Guest House/ Bed & Breakfast 67%

Various sized houses in new developments 60%

Nearby convenience store 58%

Require phasing for major developments 53%

Land uses that should not be allowed:

Two or 3 family houses in new developments 83%

Restaurants, retail shops 64%

Services (laundry, bank, etc.) 73%

Commercial development outside of business district 62%

Basic needs store (groceries, clothing) 72%

Three most serious problems facing Dunstable in the next 5 years:

Loss of rural character: 55%

Solid waste disposal: 47%

Tax increases: 27%

Should Dunstable be acquiring open space for the following purposes?

Preserve groundwater resources 90% agree Preserve unique scenic areas 81% agree

Preserve rural character 86% agree Preserve agricultural areas 80% agree

Preserve historic sites 85% agree For passive recreation purposes 73% agree

Are you willing to spend your tax dollars to protect these resources?

Yes 79%

No 11%

No answer 10%

Would you support a real estate transfer tax paid by the buyer to support open space protection?

Yes 66%

No 21%

No answer 13%

The following recreational activities were ranked as Important by more than half the respondents:

Walking 83% Running 72% Canoeing 67% Horseback riding 60%

Biking 73% Birdwatching 71% Cross-country skiing 63%

Organized athletics 73% Ice skating 68% Swimming 62%

Tennis was ranked Important by 49%, Not Important by 25%, and 16% were unsure.

ATV's were ranked Not Important by 69%; snowmobiling was ranked Not Important by 63%.

Present zoning bylaws:

Need strengthening: 44%

Are about right: 26%

Don't know: 18%

Are too restrictive: 8%

1998 DUNSTABLE OPEN SPACE AND RECREATION PLAN

Proposed Conservation Priority Matrix

This matrix can be used to rank land parcels, or portions of parcels, for their relative significance for conservation. It is intended to help indicate what Chapter lands should be priorities for conservation or Agricultural Preservation Restrictions if they become available. The matrix can be applied to any site with conservation potential. Theoretically, a parcel could score 100 points if all criteria occur significantly on site and it qualified for extra points by being on Route 113 east of the town center, or in the aquifer near the town wellfield, or on one of the named water bodies. Massapoag Pond is included under Salmon Brook as qualifying for extra points. These particular places are assigned extra points because they were specifically named as important for conservation in the input to the Open Space Plan.

Points for each column: Significant on site = 5 points Portion of site = 3 points Not on site = 0

CONSERVATION CRITERIA	SIGNIFICANT ON SITE	PORTION OF SITE	NOT ON SITE
Human Elements			
Scenic rural landscape visible from town road (5 extra points for Route 113)			
Recreational Potential for swimming			
Recreational Potential for trails			
Recreational Potential for field sports			
Recreational Potential for fishing/boating			
Historic site			
Water Resources			
Aquifer (5 extra points for proximity to town wellfield)			
Water body (5 extra points for Salmon, Unkety, Black Brooks, or Nashua River)			
Wetland			
Floodplain			

CONSERVATION CRITERIA	SIGNIFICANT ON SITE	PORTION OF SITE	NOT ON SITE
Subtotal from other side			
Wildlife Habitat			
State-listed rare species			
Diversity of habitat types			
Unusual habitat type			
Land Use Capability			
Prime and/or Important Farmland Soil (Middlesex County Soil Survey)			
Prime Forest Land Classification (Univ. of Mass. Dept. of Forestry)			
Actively managed for farm/forest			
Parcel Configuration and Location			
Abuts existing conservation land			
Hilltop or hillside topography			
Large block of undeveloped land			
Total Points for Site			

Appendix D Other Documentation

Letter from Russell Cohen, Rivers Advocate with Massachusetts Riverways Program, regarding Salmon Brook, April 22, 1996

List of Historic Sites in Dunstable, from 1976 Plan 3 pages